Agilent 6890 & 6850 GC Control Driver User Guide

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Publication Number BR501552
Revision C

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Introduction

This document describes the configuration of the Agilent Technologies 6890 GC driver. It also explains how to build a control method for this driver, how to start and view a running acquisition and what actions are available during an analysis.

Installation and Configuration

Installing the Driver Software

To install the CompassCDS Driver software, refer to the CompassCDS installation Guide.

Configuring the GC Communications

Serial Communications

The Agilent Technologies 6890 Gas Chromatograph uses RS232 protocol as the method of communications for instrument control and for sending digital data to the external data system.

The serial connection is made at the back at the 6890 GC.

Serial communication is standard on all Agilent 6890 or 6850 GCs.

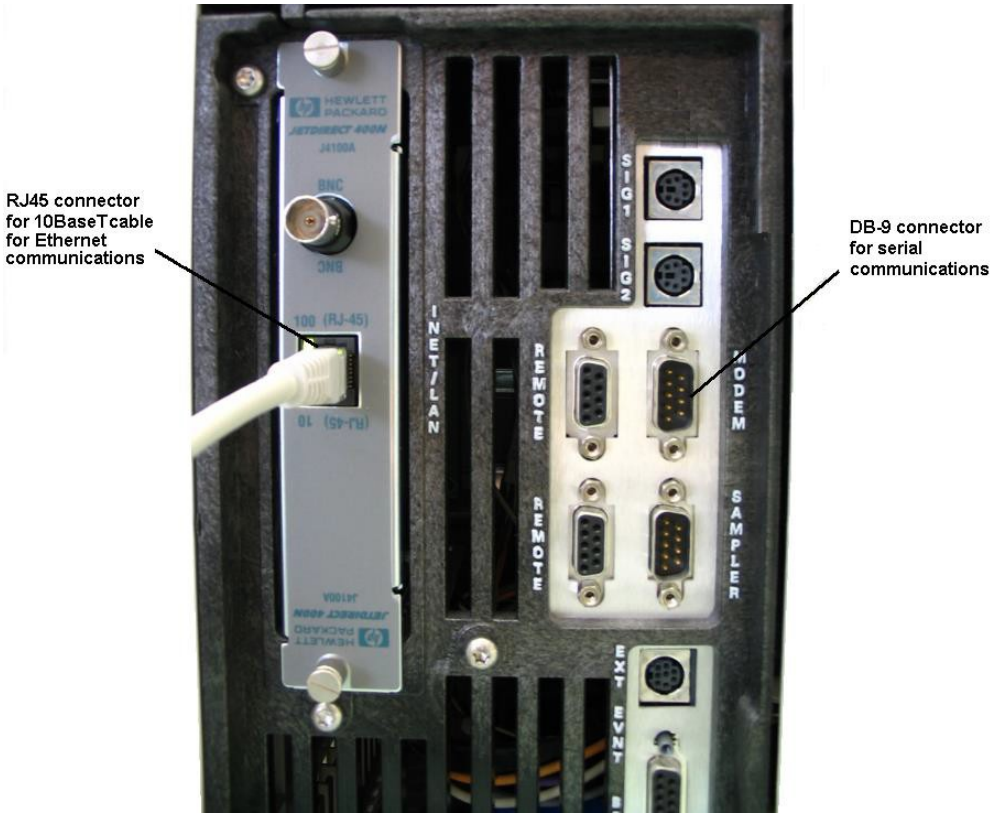
Ethernet Communications

The Agilent 6890 Gas Chromatograph uses Ethernet® as the method of communications for instrument control and for sending digital data to the external data system.

Ethernet communication is standard on the Agilent 6890 GC.

The Ethernet connection is made at the back at the 6890 GC. There are two types of Ethernet cables

- An Ethernet crossover cable is used when the Agilent 6890 GC is connected directly to the CompassCDS Acquisition Server PC.
- A standard Ethernet patch cable is used when the Agilent 6890 GC is connected to a company Ethernet network.



The Agilent 6890 GC uses TCP/IP (Transmission Control Protocol / Internet Protocol) to communicate over the Ethernet network and needs to be given a unique IP address to identify the instrument.

A BOOTP Server or a DHCP server is used to send IP addresses to TCP/IP devices.

The BOOTP Server lists Ethernet addresses along with the IP addresses that are to be assigned to the corresponding devices.

To know how to configure the BOOTP server, refer to the CompassCDS installation Guide.

It is also possible to give a fixed IP address to the GC. To know how to fix the IP address of the GC, refer to the 6890 GC manual.

NOTE: The BOOTP server provided by CompassCDS is installed during the installation of the CompassCDS software.

Configuring the Driver

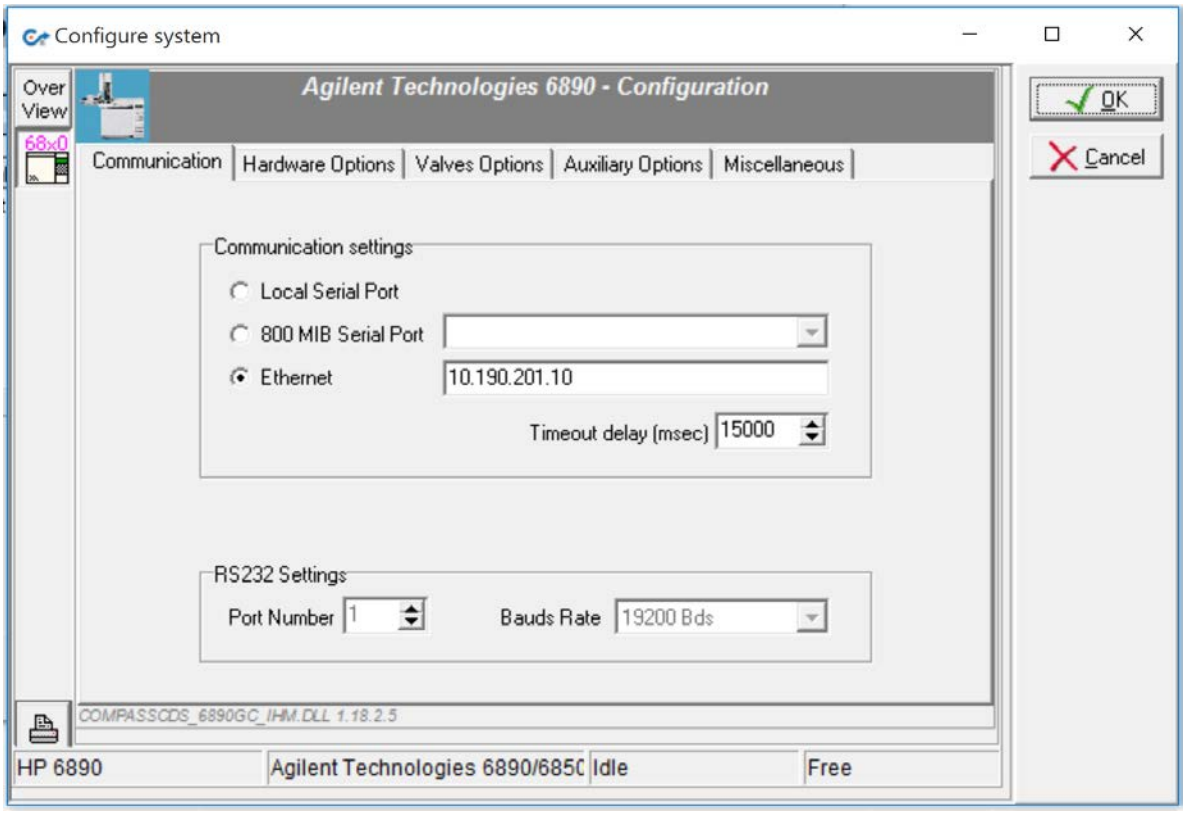
The driver software configuration is done in the CompassCDS Configuration Manager when a new chromatographic system is created.

Configuring the Agilent 6890 Gas Chromatograph

Click on the

button corresponding to the Agilent 6890 GC driver and the configuration screen appears.

Communication Window



Communication settings Parameter Group

Local Serial Port

Select this option if the chromatograph is connected directly to the serial port of the PC.

STAR 800 & 850 MIB Serial Port:

Select this option and then the name of the STAR 800 & 850 MIB interface used to connect to the chromatograph.

Ethernet

Select this option if the chromatograph is controlled via Ethernet communication and type the IP address of the instrument.

NOTE: If you will be using the Serial port installed in the STAR 800 & 850 MIB interface, configure the MIB-interface module before configuring the Agilent Technologies 6890 Gas Chromatograph driver.

RS232 settings Parameter Group

Port Number

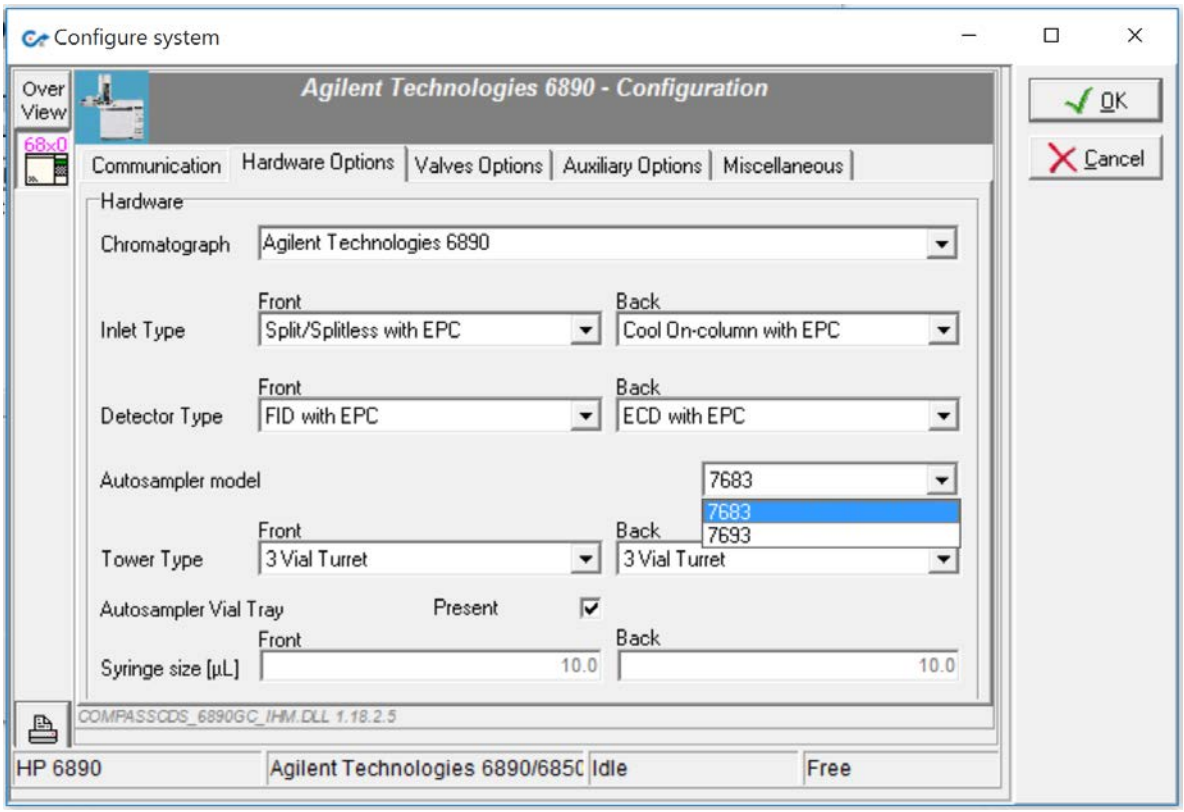
Select the PC or STAR 800 & 850 interface Serial port number on which the chromatograph will be connected.

Baud Rate

Select the baud rate to communicate with the GC. Two choices are available 19200 or 9600.

To determine the baud rate of the GC, refer to the appendix Configuring the GC RS232 communication.

Hardware Options Window



Hardware Parameter Group

Chromatograph

Select the *Chromatograph* model. Available choices are: Agilent Technologies 6890, Agilent Technologies 6890 Plus, Agilent Technologies 6850.

The back inlet, detector and sampler options are available only for Agilent Technologies 6890 and Agilent Technologies 6890 Plus. Only one inlet, one detector and one sampler can be configured with an Agilent 6850 GC.

Front and Back Inlet Type

Select the *Front* and *Back Inlet Type*. The available choices are: None, Purged packed, Purged packed with EPC, Cool On-Column, Cool On-Column with EPC, Split/Splitless, Split/Splitless with EPC, Gerstel CIS3 PTV with EPC, Gerstel CIS4 PTV with EPC, PTV with EPC, PCM, PCM with heater.

Front and Back Detector type

Select the *Front* and *Back Detector Type*. The available choices are: None, FID, FID with EPC, TCD, TCD with EPC, NPD and NPD with EPC.

Autosampler Type

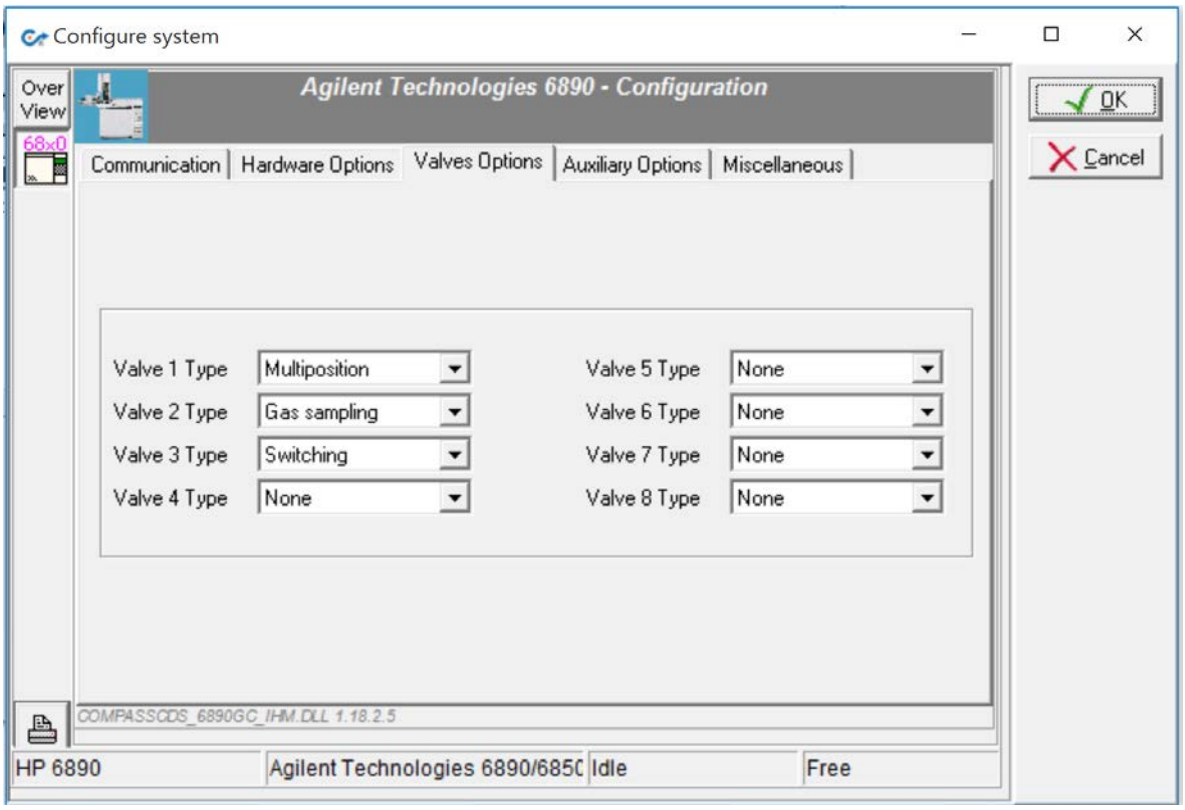
Select either Autosampler 7683 (old model) or 7693 (new model). For the 7693 autosampler a syringe volume has to be entered for the front and back Autosampler position.

Front and Back Sampler Type

Select the *Front* and *Back Sampler Type*. The available choices are: None, 3 Vial Turret, 8 Vial Turret, 22 (2 mL) Vial Turret, 27 (4 mL) Vial Turret.

Check *Present* if the chromatographic system is equipped with a 100 Vial Tray.

Valves Options Window

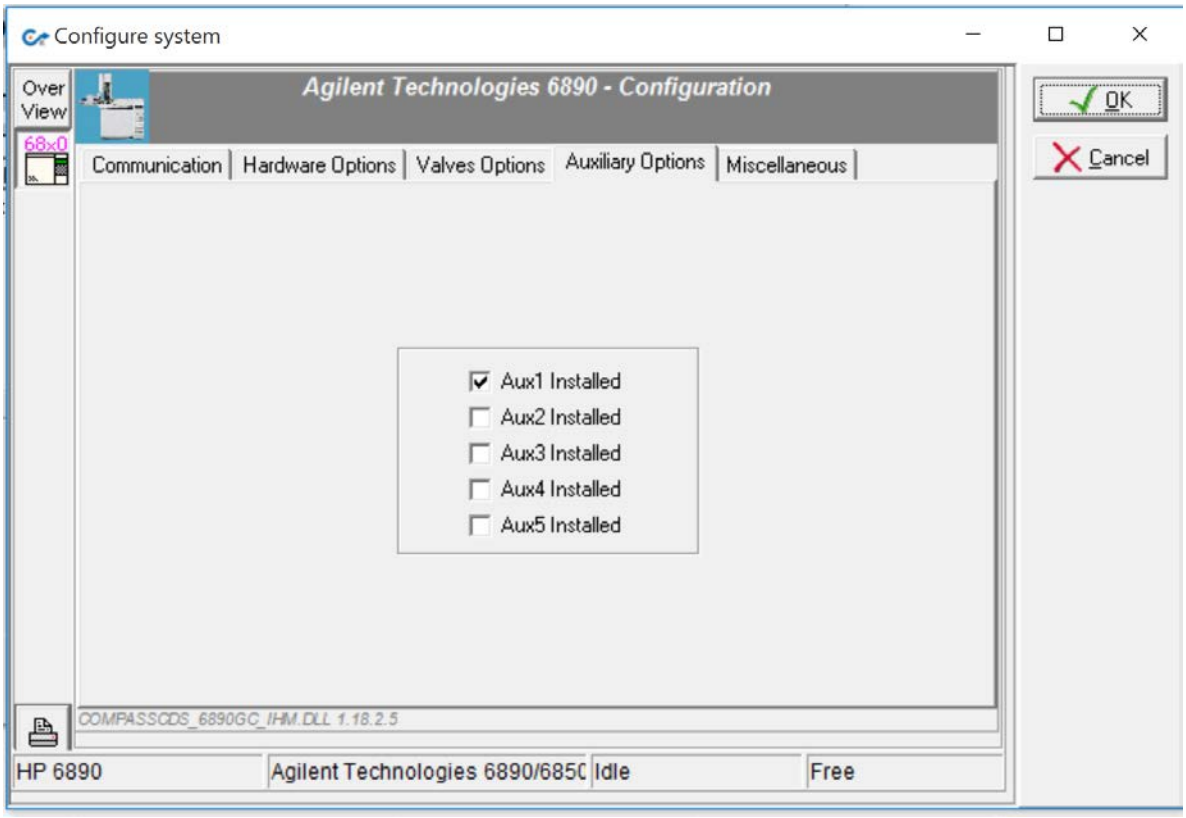


The user can configure up to 8 valves.

Select the *Valve Type*. Four choices are available: *None*, *Multiposition*, *Gas sampling*, *Switching*.

- Multiposition: Generally used as a gas stream selection valve, to select one of several gas streams.
- Gas sampling: A run is automatically started when the valve switches from load position to inject position.
- Switching: Generally used to select one of two columns for analysis.

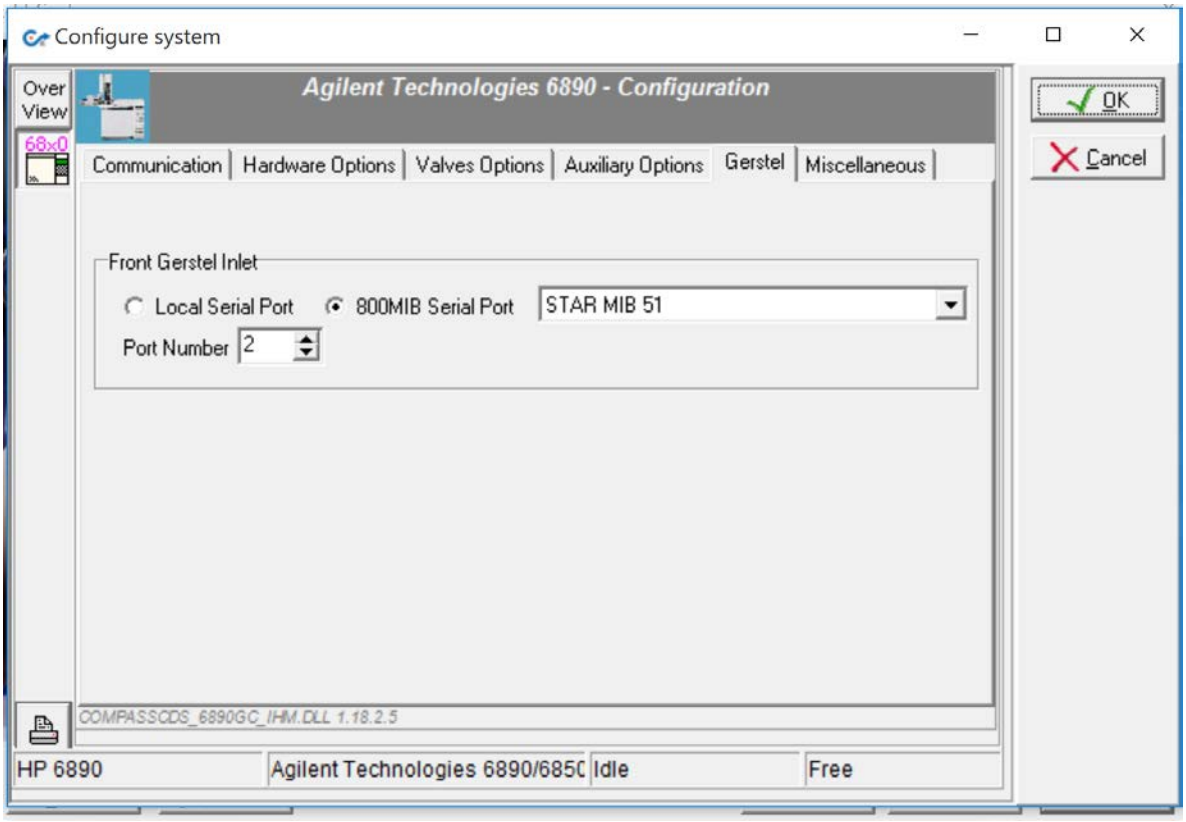
Auxiliary Options Window



This instrument gives the user the choice of two extra heating blocks (Aux 1 and 2) (for example, to heat a retention- gap) and three additional pneumatics (Aux 3, 4 and 5). Check the corresponding box(es)

To save the configuration, click on the *OK* button. Then right click on the system name in the bottom part of the *CompassCDS Configuration Manager* browser. A pop-up menu appears: click on *Stop.* Then right click on the system name again, and click on *Start.*

Gerstel Window



Front/Back Gerstel Inlet Parameter Group

Local Serial Port

Select this option if the Gerstel controller is connected directly to the PC.

STAR 800 & 850 MIB Serial Port:

Select this option and then the name of the MIB-interface used to connect to the Gerstel controller.

Port Number: COM

Select the PC or STAR 800 & 850 interface Serial port number on which the Gerstel controller will be connected.

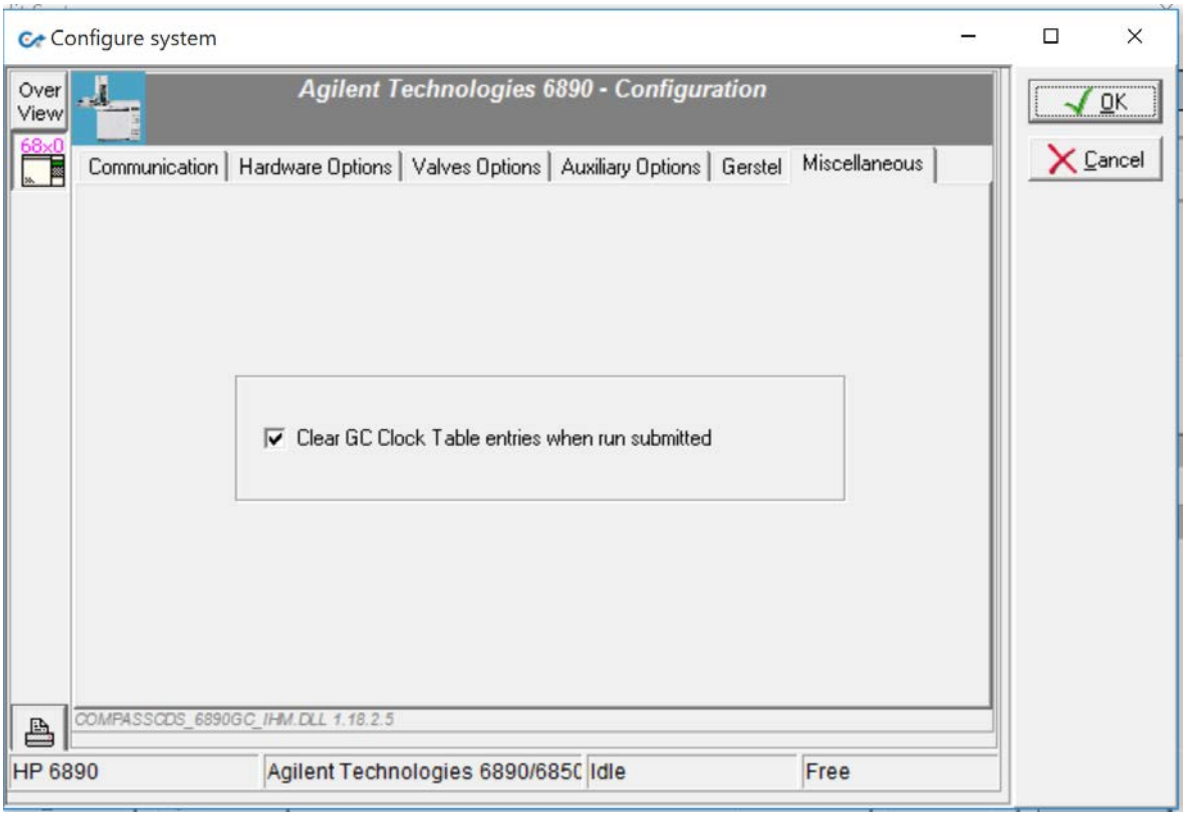
NOTE: If you will be using the Serial port installed in the STAR 800 & 850 interface, configure the MIB-interface module before configuring the Agilent Technologies 6890 Gas Chromatograph driver.

For more information about the configuration of the MIB-interface, refer to the STAR 800 & 850 Interface MIB User Guide.

NOTE: Once the system has been created and correctly configured, it must be associated to one or several projects in order to start some acquisitions. For more details about the creation and configuration of a system, refer to the CompassCDS Configuration Manager User Guide.

Press the button to print the current configuration.

Miscellaneous Window



Clear GC Clock Table entries when run submitted

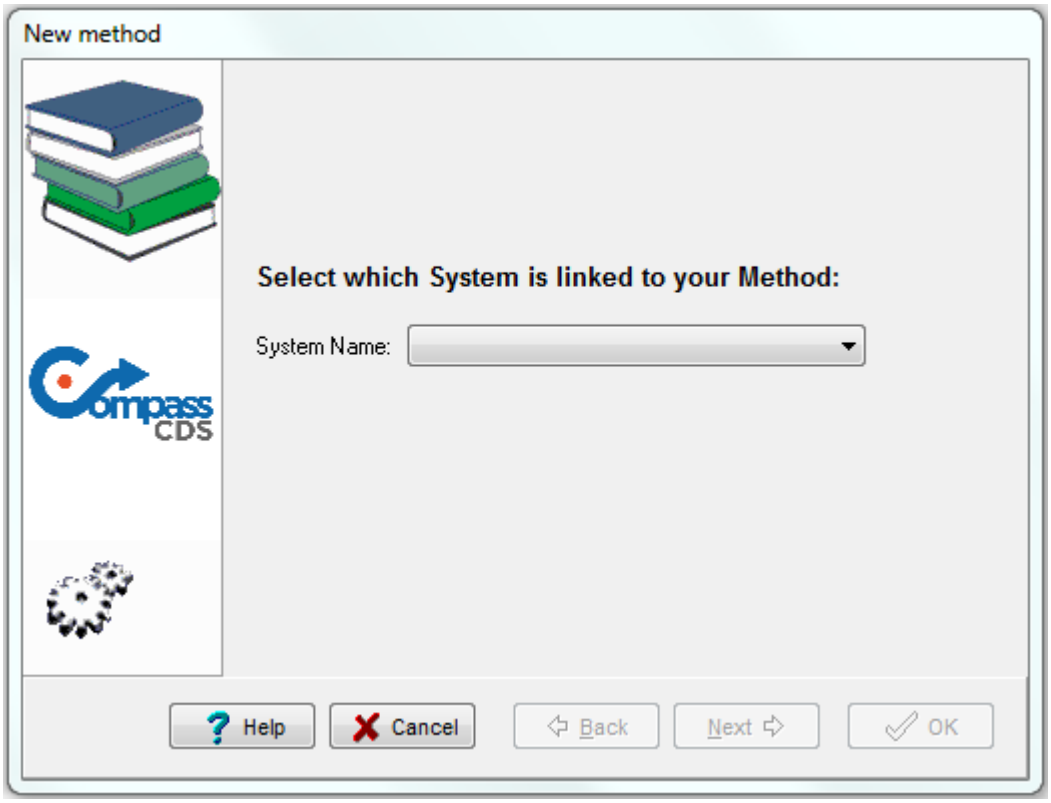
Check this option if you want to clear the GC Clock Table prior to each run. The GC Clock Table give the ability to activate a GC method at a certain time, start a run at a certain time of the day… As such event can interact with CompassCDS activity, it is recommended to clear the GC Clock Table priority to each run.

Building a Method

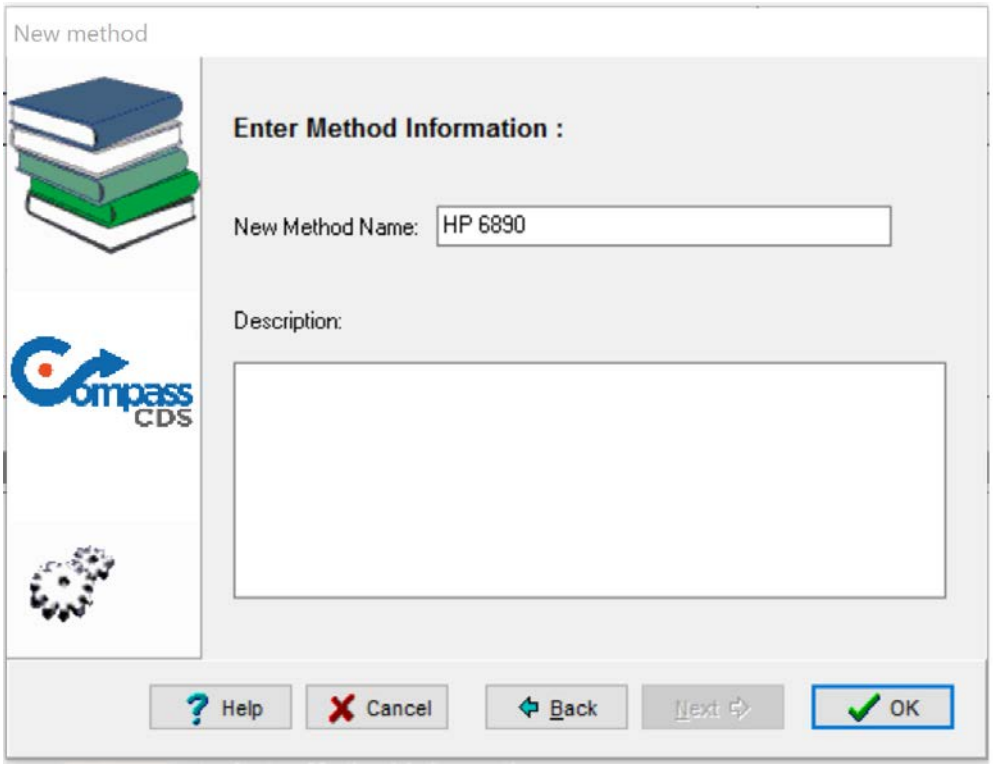
Creating a New Method

The method contains parameters for instrument control, data acquisition, chromatogram processing, and editing of final results. To initially set up a method, it is not necessary to define all of the sub-method sections; however, you must fill in the instrument control section prior to starting an acquisition.

1. To create a new method, select the ***FILE / NEW METHOD*** option from the CompassCDS Chromatography Data System main menu.
   A wizard guide will appear and provide assistance during the first steps of method creation



2. Choose the system (chromatograph) associated with the method. A method is created for a particular system. When starting an acquisition, the name of the system that performs the acquisition must be correct, since method access is limited only to those methods associated with this system.
3. Once this field is completed, click on the Next button to move to the second step of the method creation



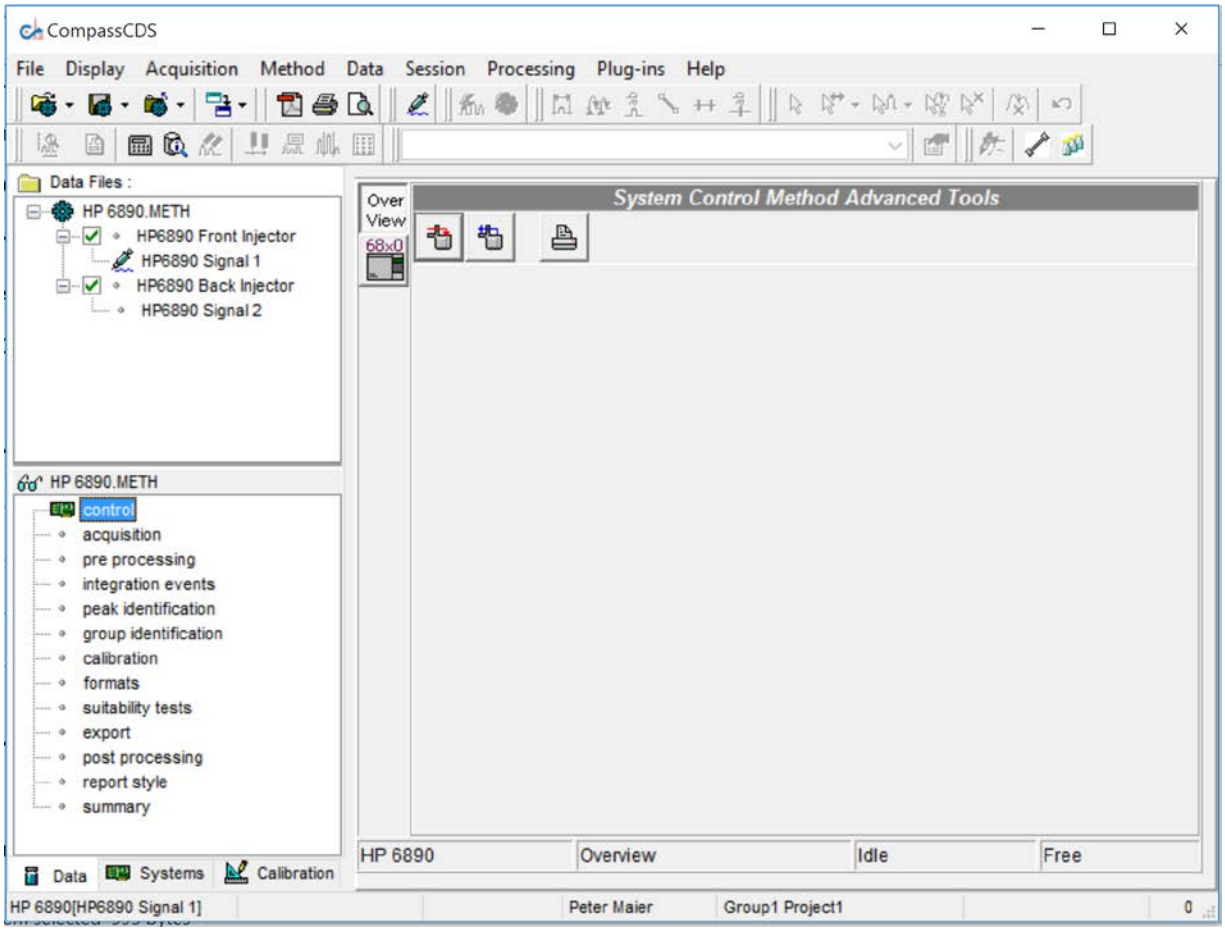
4. Enter the *New Method Name* in the first field. In the *Description* field, enter information concerning the method (optional).
5. Once these two fields have been completed, click on the *OK* button. The new method is created and is opened with default parameters in the CompassCDS Chromatography Data System. The next step is the definition of each of the method sections.

The control section must be defined in order to start an acquisition. In the following part of this guide, only the instrument control section for the Agilent 6890 Gas Chromatograph is detailed. Other parameters such as *Injection Volume*, *Vial* and *Rack* number may be necessary and are defined in the acquisition section.

NOTE: For more details about the programming of each method section, turn to the CompassCDS Chromatography Data System User Guide.

Control Method Section for the Agilent 6890 Gas Chromatograph

Once the new method is created, select the control section in the lower part of the browser. The following screen appears



Press the Over View button to display the ***System Control Method Advanced Tools*** window

to send the current method to the instrument

to get the active method from the instrument

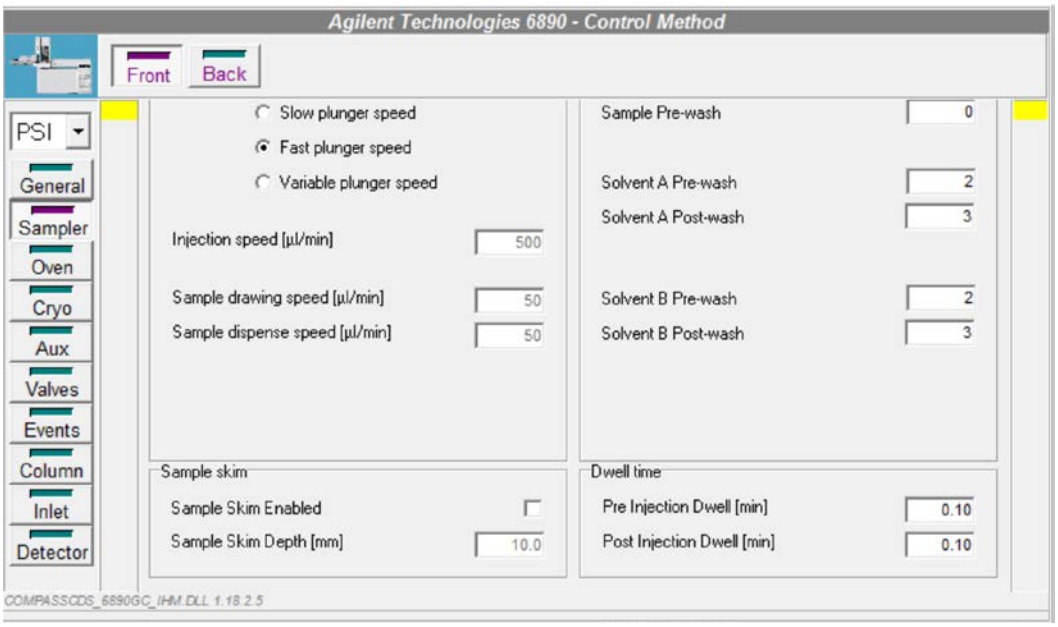
to print the current method

Click on the button to display the Agilent 6890 Gas Chromatograph control method section.

It contains 8 sub-sections: *General, sampler, Oven, Cryo, Events, Column, Inlet and Detector*. Up to two additional sub-sections can be also activated depending on the system configuration: *Aux* (if *Auxiliaries* have been configured), and *Valves* (if *Valves* have been configured). Click on the required sub-section to define the corresponding parameters that will be used during the chromatographic run.

A scrolling list in the left top corner allows you to choose the pressure unit. The available choices are: *bar*, *psi*, *kPa*. A *Send* button sends the program parameters to the GC.

Sampler Control



Depending on the system configuration, select the *Front* or *Back* button, to set the sampler information of each sub-system.

NOTE: The Agilent Technologies 6850 Gas Chromatograph has only one sub-system. Therefore, only the *Front* information should be set.

Select the *Active* box to activate and take into account the *Sampler parameters*.

In the *Sample Pumps* field, enter the number of pumps before the injection (plunger strokes to avoid the formation of bubbles). The allowed range is 0–15.

In the *Viscosity Delay* field, enter a time (in seconds). During this time, the syringe plunger has a pause between the pumping and the injection stroke. For viscous samples, the pause allows the sample to flow into the vacuum created in the syringe. The allowed range is 0–7.

In the *Sample Pre-wash* field, enter the number of syringe washes with the sample, before injection. The allowed range is 0-15.

In the *Solvent A* and *B Pre-wash*, enter the number of syringe washes with solvent A and/or B, before injection. The allowed range is 0–15.

In the *Pre Injection Dwell Time,* enter the time the needle stays in the inlet before the injection. In the *Post Injection Dwell Time*, enter the time the needle stays in the inlet after the injection. Check *Sample Skim Enabled* if you want to modify the position of the needle in the sample vial.

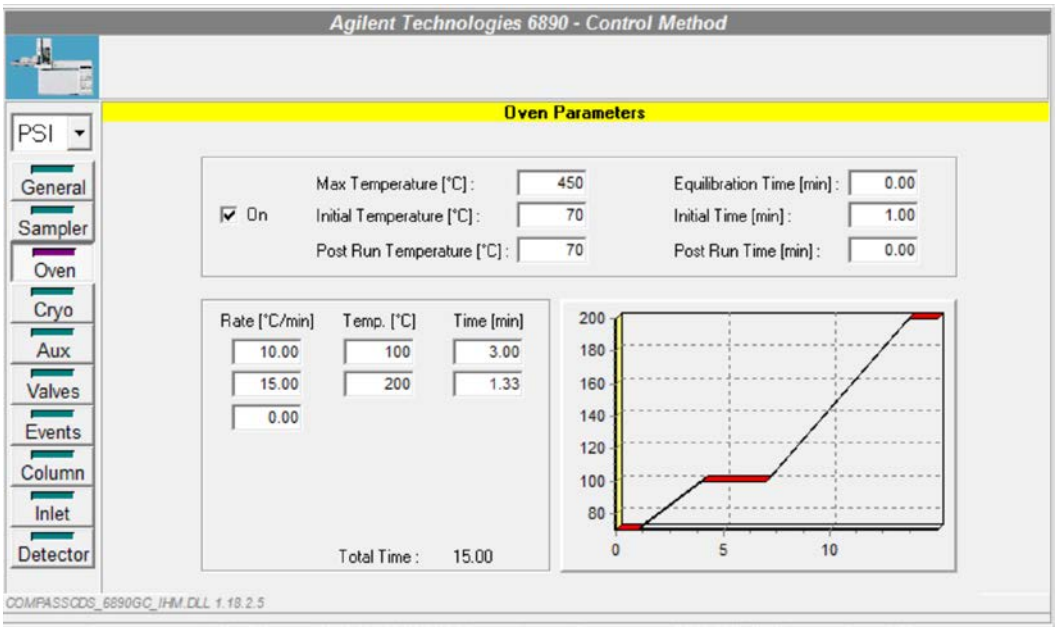
In the *Sample Skim Depth,* enter the difference between the default needle position in the sample vial and the desired one (negative or positive values).

In the *Solvent A* and *B Post-wash*, enter the number of syringe washes with solvent A and/or B, after injection. The allowed range is 0–15.

Select the plunger speed during the injection. Three choices are available: *Slow Plunger Speed, Fast Plunger Speed* or *Variable Plunger Speed*. If *Variable Plunger Speed* is selected, three additional values should be entered, the *Drawing Speed*, the *Dispense speed* and the *Injection Speed*.

NOTE: The volume that will be injected depends of the syringe size. Only five levels of injection volume for the 6890 and six levels for the 6850 can be programmed for this driver in the Acquisition sub-method part: 1, 2, 3, 4, 5 and (6). These values represent the number of tenth of the syringe volume. For example, if the entered volume is 3 and the syringe volume is 10 µL, the injected volume will be 3 10^{nth}= 3 µL. A physical turret option called *Nanoliter* allows the injection of smaller volume (refer to the Agilent manual to know more about this option). Refer to the Appendix (*Injection Volumes* section) to see the correspondence between the programmed levels and the real injected volumes.

Oven Control



Check the *On* box to activate the oven programming.

In the *Max Temperature* field, enter the column maximum temperature in °C.

In the *Equilibration Time* field, enter the time before the GC becomes ready in minutes. In the *Initial Temperature* field, enter the column initial temperature in °C.

In the *Initial Time* field, enter the time the GC stays at the *Initial Temperature* (first plateau) in minutes.

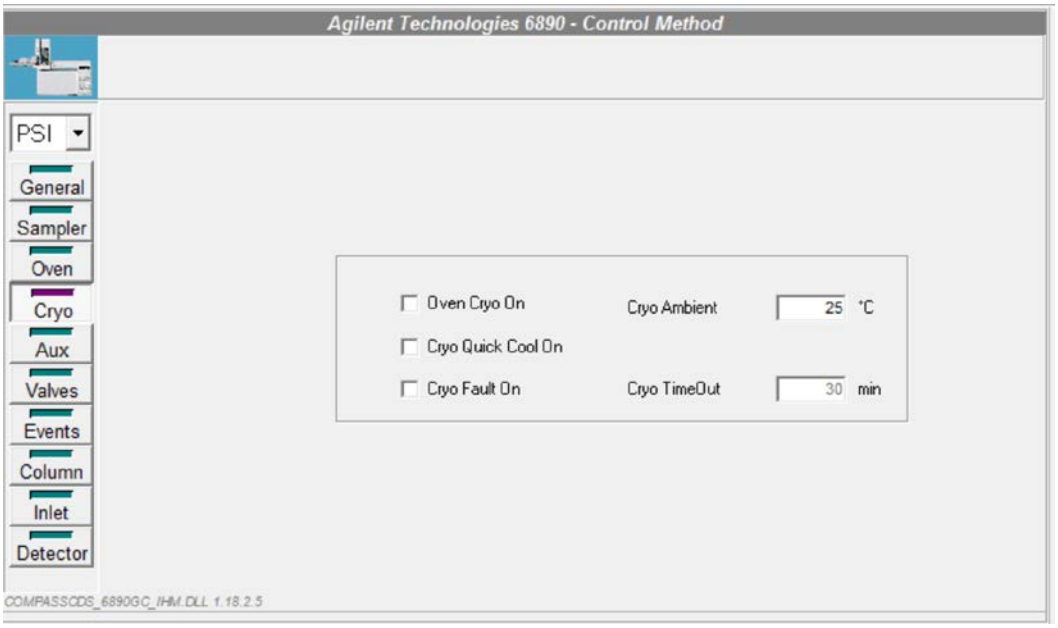
In the *Post Run Temperature* field, enter the temperature which is maintained in the column after the analysis.

In the *Post Run Time* field, enter the time the GC maintains the *Post Run Temperature* in the column after the analysis in the table program the rates, the plateau temperatures, and the duration of the oven plateau temperature.

The graphic to the right side of the table displays the oven temperature program.

The total time of the oven program is displayed in the *Total Time* field.

Cryo Control



The cryogenic system generates an oven temperature lower than the ambient temperature.

Check the *Oven Cryo On* box to activate the cryogenic system for the column oven. Enter the ambient temperature in the *Cryo Ambient* field. Below this temperature, column oven cryogenics will be used.

Check *Cryo Quick Cool On* to quickly cool the oven after a run.

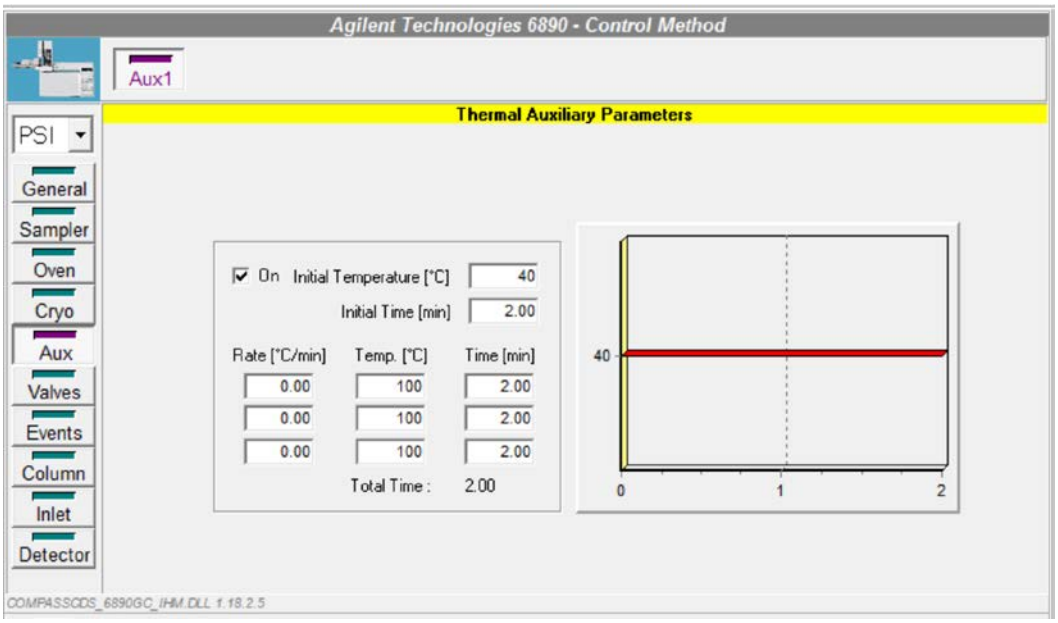
Check *Cryo Fault On* to stop the oven after 17 minutes if the cryogenic system has not reached the desired temperature. The oven stops if no injection is started before the time entered in the *Cryo Timeout* field.

Aux Control

The instrument allows to configure two heater blocks (Aux 1 and 2) and three pressure control channels (Aux 3, 4 and 5).

This sub-section is active only when at least one auxiliary is configured for the system in the CompassCDS Configuration Manager. The different fields depend on system configuration.

Thermal Auxiliary Parameters



Check the *On* box to enable temperature programming.

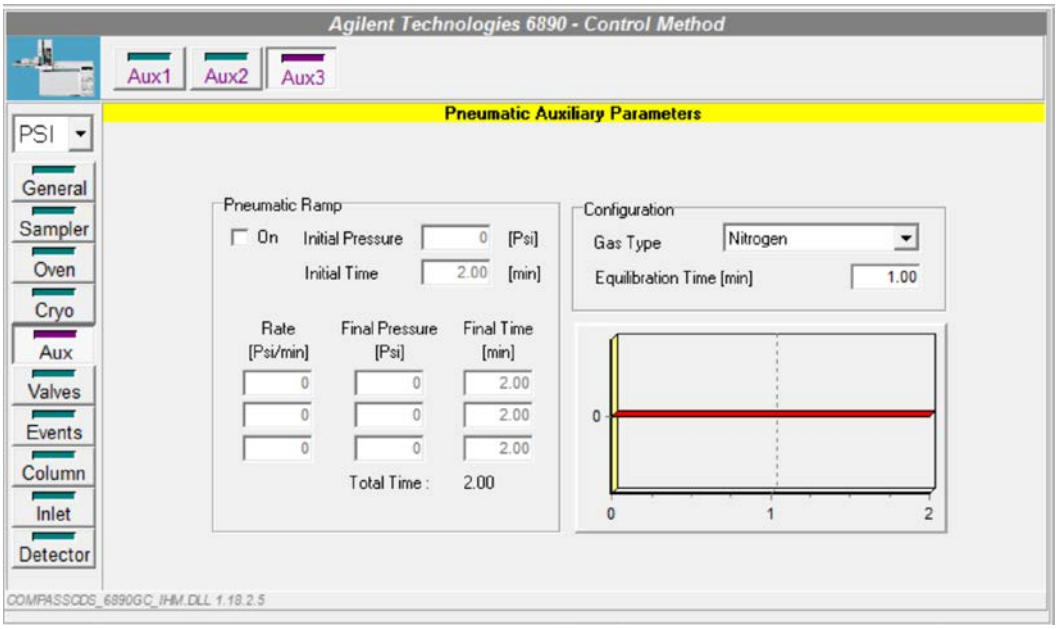
In the *Initial Temperature* field, enter the initial temperature in °C.

In the *Initial Time* field, enter the time the heater block stays to the *Initial Temperature* (first plateau) in minutes.

In the table program the rates, the plateau temperatures, and the duration of the heater block plateau temperature. The graphic to the right of the table displays the temperature program.

The total time of the heater block program is displayed in the *Total Time* field.

Pneumatic Auxiliary Parameters



Pneumatic Ramp Parameter Group

Check the On box to enable pressure programming. In the Initial Pressure field, enter the initial pressure.

The pressure units will be those shown in the list box in the top left corner of the 6890 method window.

In the Initial Time field, enter the time for this first plateau in minutes.

In the table in minutes, program the rates, the plateau pressure, and the duration of the plateau pressure. The figure on the right side displays the pressure program.

The total time of the program is displayed in the Total Time field.

Configuration Parameter Group

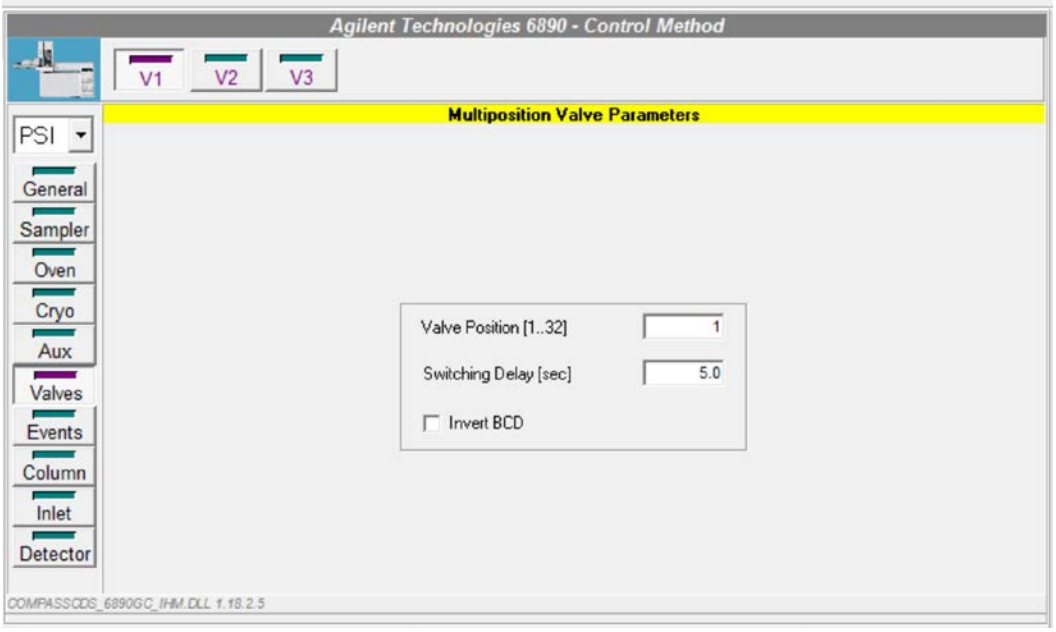
Select the Gas type. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, Oxygen, Air, Argon, Unknown.

In the Equilibration Time field, enter the time before the auxiliary becomes ready.

Valves Control

The instrument can have up to eight valves configured. The different fields depend on system configuration. Three types of valves exist: *gas samling, multiposition*, and *switching valves*.

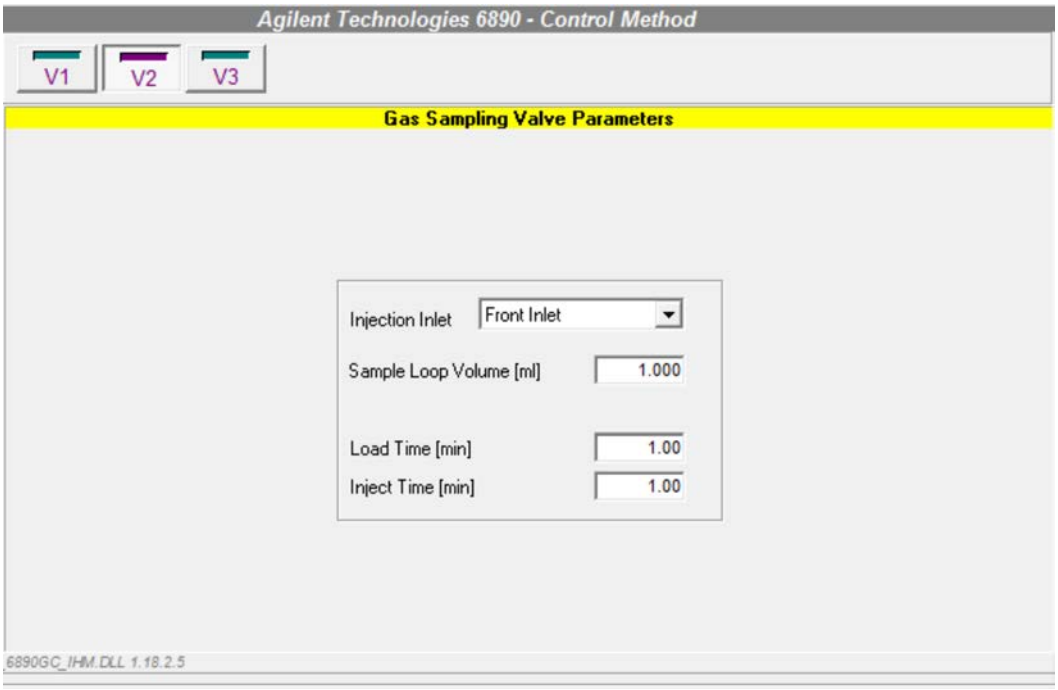
Multiposition Valve Parameters



In the Valve Position field, enter the initial position of the valve among 32 positions. In the Switching Delay field, enter the time between the valve switches.

Check the Invert BCD checkbox to invert the valves codes.

Gas Sampling Valve Parameters



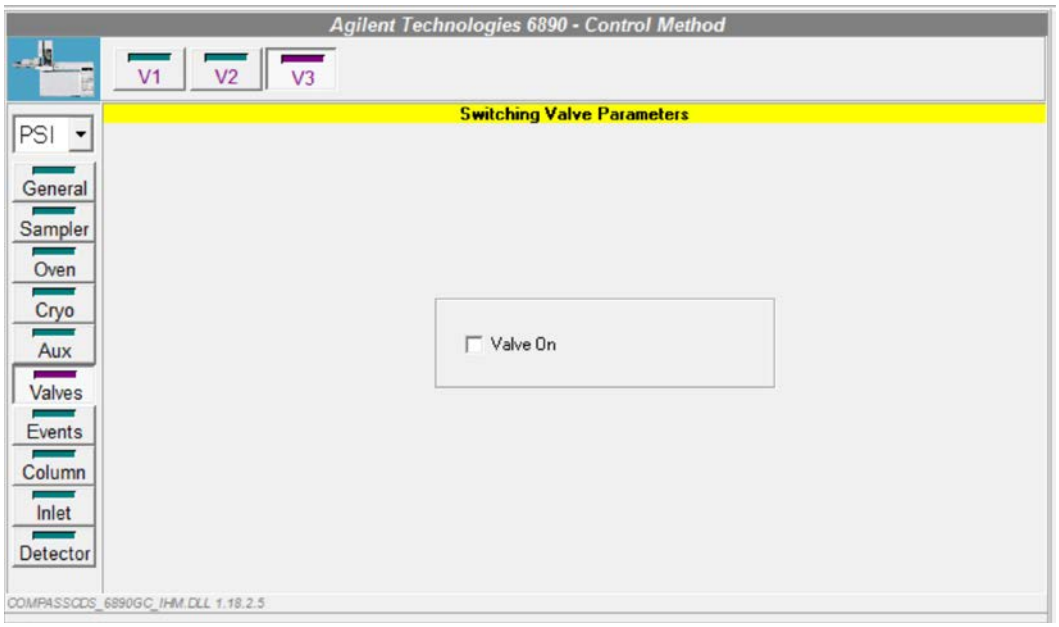
Select the *Injection Inlet* which is connected to the gas sampling valve. The available choices are: *Front Inlet*, *Back Inlet*, *Aux3*, *Aux4*, *Aux5*.

In the *Sample loop volume* field, enter the loop volume in mL.

In the *Load time* field, enter the time the valve stays in load position.

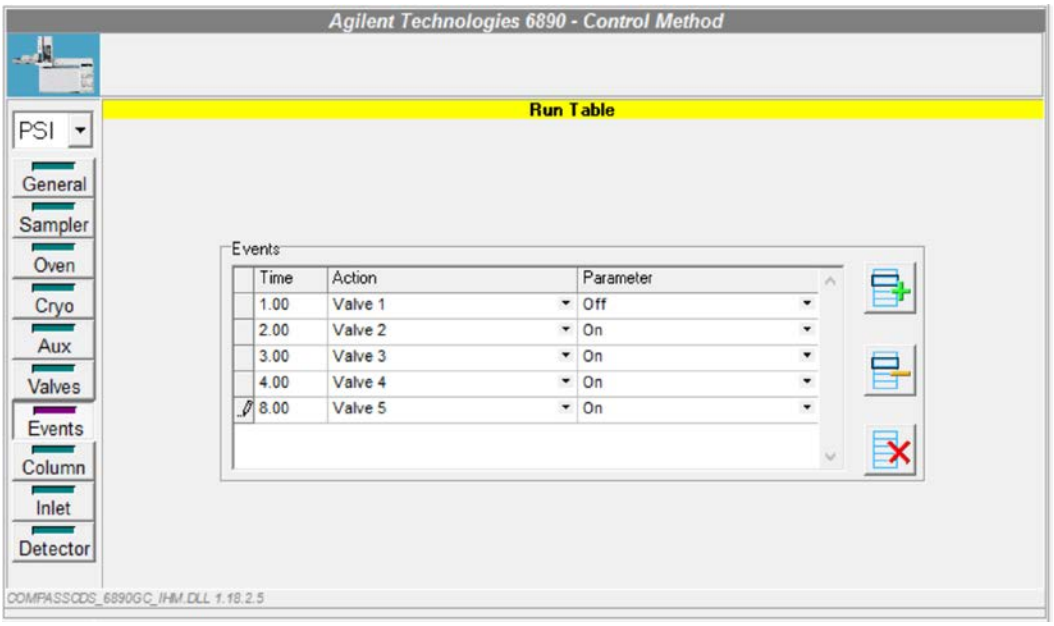
In the *Inject time* field, enter the time the valve stays in inject position. As soon as the inject time begins, the acquisition starts.

Switching Valve Parameters



Check the Valve On checkbox to activate the valve. It allows the switching of the valve from one position to another. An event must be added in the event table to switch the valve.

Events Control



In this table program events like valve switching, signal range, and attenuation, autozero, TCD

polarity change, etc.

NOTE: If the valve rotation is programmed with the event table, it would be better to program the initial position at the end of the analysis.

Use the following buttons to edit the table

to add a line to the table

to delete a line in the table

to clear the entire table

In the Time column enter the time when the action has to be done.

In the Action column, select the action to do. The available choices are

Valve 1	Signal 1 zero	Signal 2 Resume
Valve 2	Signal 1 attenuation	Aux 3 pressure
Valve 3	Signal 1 range	Aux 4 pressure
Valve 4	Signal 1 Freeze	Aux 5 pressure
Valve 5	Signal 1 Resume	Front TCD Invert Polarity
Valve 6	Signal 2 zero	Back TCD Invert Polarity
Valve 7	Signal 2 attenuation	Front NPD Fuel
Valve 8	Signal 2 range	Gas Back NPD Fuel Gas
Multi-position valve	Signal 2 Freeze	

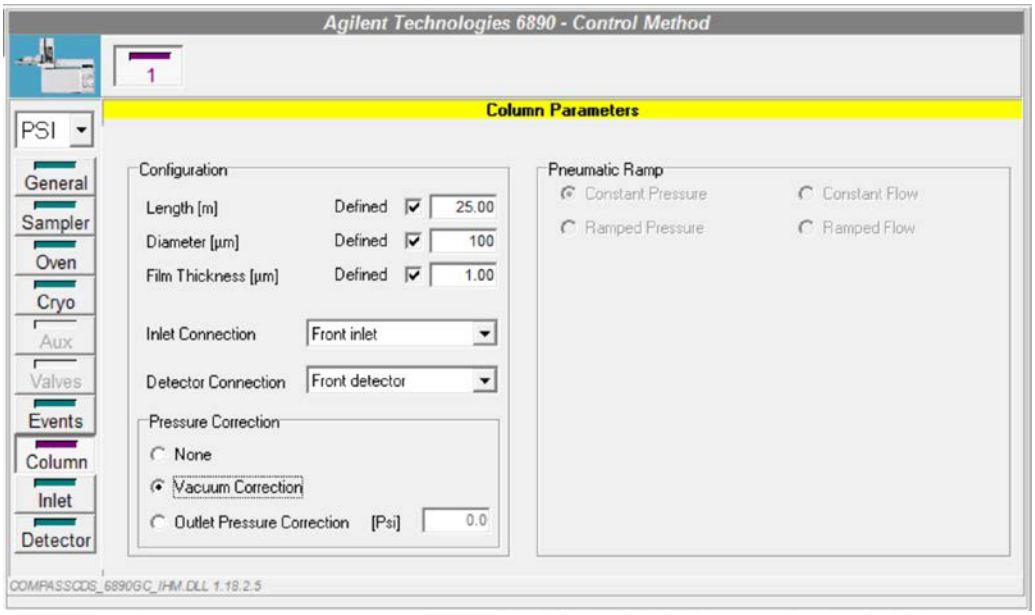
In the *Parameter* column, select if the valve is switched *On* or *Off* at the specified time.

Column Control

Depending on the system configuration, select the *1 or 2* button, to set the column information of each sub-system.

NOTE: The Agilent Technologies 6850 Gas Chromatograph has only one sub-system. Therefore, only the *1* information must be set.

The different fields depend on system configuration.



Configuration Parameter Group

In the Length field, enter the column length in meters, if Defined box is checked.

In the Diameter field, enter the column diameter in microns, if Defined box is checked.

In the Film Thickness field, enter the column film thickness in microns, if Defined box is checked.

Select the Inlet Connection. The available choices are: Front inlet, Back inlet, aux3, Aux4, Aux 5, Unknown.

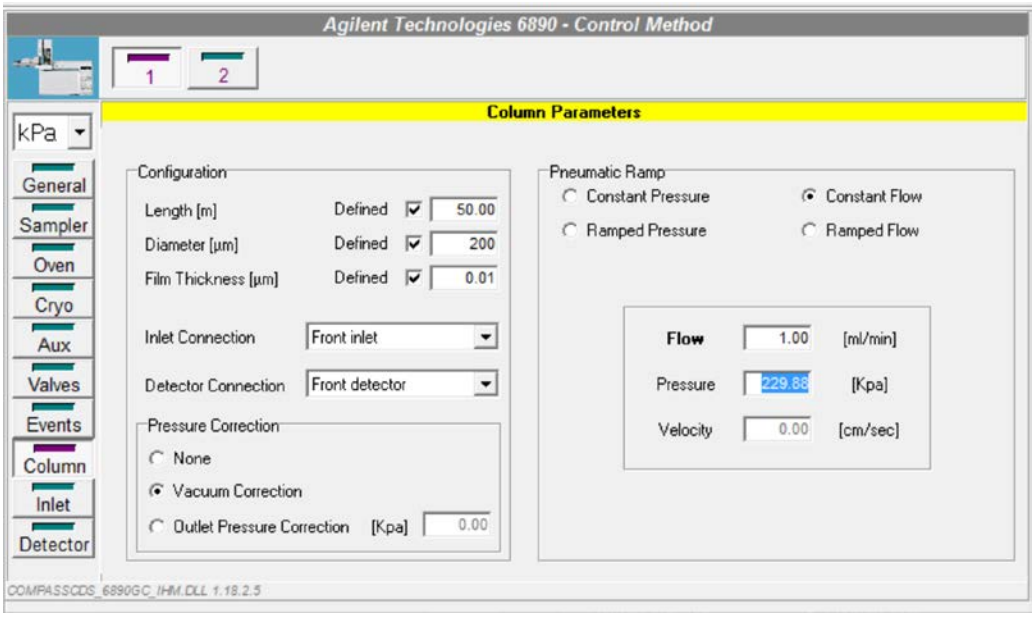
Select the Detector Connection. The available choices are: Front detector, Back detector, MSD (Mass Spectrometry Detector), AED (Atomic Emission Detector), Others.

Check the Vacuum Correction box to correct the output pressure, when the column is connected to a detector which pressure is lower than the atmospheric one (MSD).

Check the Outlet Pressure Correction box to correct the output pressure, when the column is connected to an AED. Enter the pressure of the detector.

Pneumatic Ramp Parameter Group

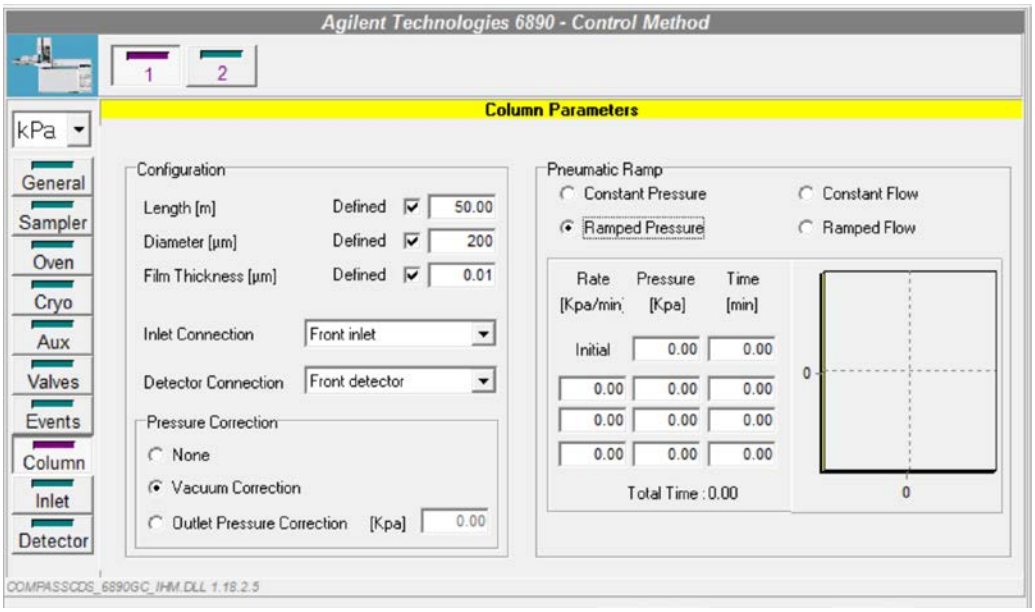
These parameters are active only if the inlet is controlled by an EPC (Aux3, Aux4, Aux5 or Inlet with EPC).



Check the Constant Pressure to maintain a constant pressure in the column. Then enter the corresponding pressure or flow in the Pressure or Flow fields.

Check the Constant Flow to maintain a constant flow in the column. Then enter the corresponding flow or pressure in the Flow or Pressure fields.

The velocity is displayed in the Velocity field.



Check the Ramped Pressure to set a pressure program.

In the table program the rate, the plateau pressure, and the duration of the column plateau pressure. The graphic to the right of the table displays the pressure program.

The total time of the program is displayed in the Total Time field. Check the Ramped Flow to set a flow program in the column.

In the table program the rate, the plateau flow, and the duration of the column plateau flow. The graphic to the right of the table program displays flow program.

The total time of the program is displayed in the Total Time field.

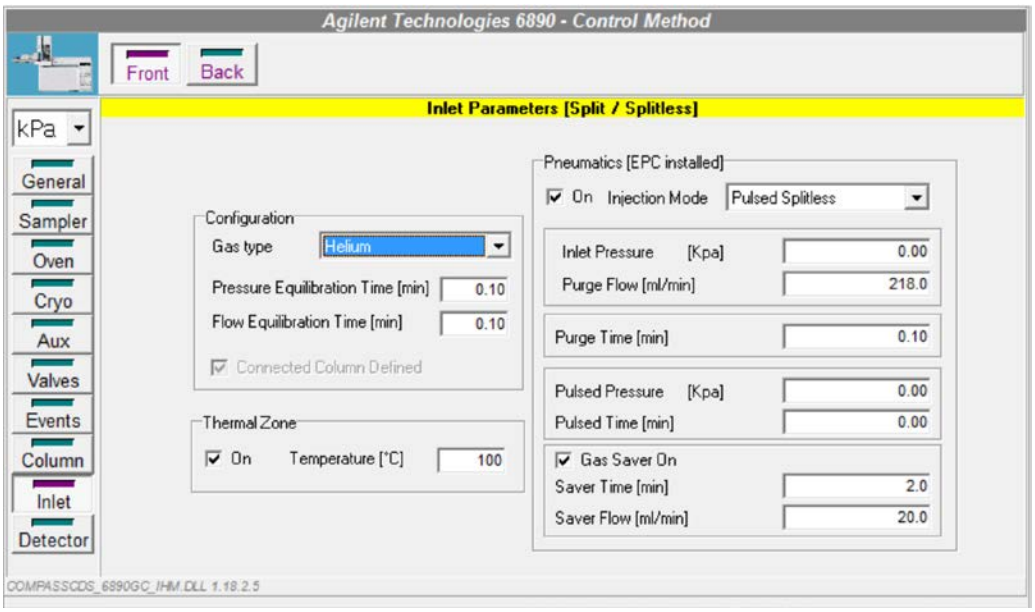
Inlet Control

Depending on the system configuration, select the Front or Back button, to set the inlet information of each sub-system.

NOTE: The Agilent Technologies 6850 Gas Chromatograph has only one sub-system. Therefore, only the Front information should be set.

The different fields depend on system configuration.

Split/Splitless



Configuration Parameter Group

Select the Gas type. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, Oxygen, Air, Argon, and Unknown.

In the Pressure Equilibration Time, enter the time before the inlet pressure becomes ready. In the Flow Equilibration Time, enter the time before the inlet flow becomes ready.

The Connected Column Defined field is selected if the column configuration has been defined in the Column Parameters sub-section.

Thermal Zone Parameter Group

Check the On box to activate the inlet temperature. Enter the desired Temperature.

Pneumatic Parameter Group

Check the On box to activate the pneumatic parameters.

Select the Injection mode. The available choices are: Split, Splitless, Pulsed split and Pulsed splitless. According to this choice, the following parameters are activated or not.

In the Inlet Pressure field, enter the pressure of the inlet.

In the Split Ratio field, enter the ratio between the flow division and column flow. This field is available only if the

Split and *Pulsed Split* inlets are selected.

In the Purge flow field, enter the flow of the purge vent in mL/min. This field is available only if the Splitless and

Pulsed Splitless inlets are selected.

In the Total Flow field, enter the sum of the division flow, the column flow and the septum purge flow. This field is available only if the column parameters have not been defined in the Column Parameters sub-section.

In the Purge Time field, enter the time the purge valve is opened. This field is available only if the Splitless and Pulsed Splitless inlets are selected.

In the Pulsed Pressure field, enter the inlet pressure when the acquisition starts. This field is available only if the Pulsed Split and Pulsed Splitless inlets are selected.

In the Pulsed Time field, enter the time the pulsed pressure is maintained in the inlet. This field is available only if the Pulsed Split and Pulsed Splitless inlets are selected.

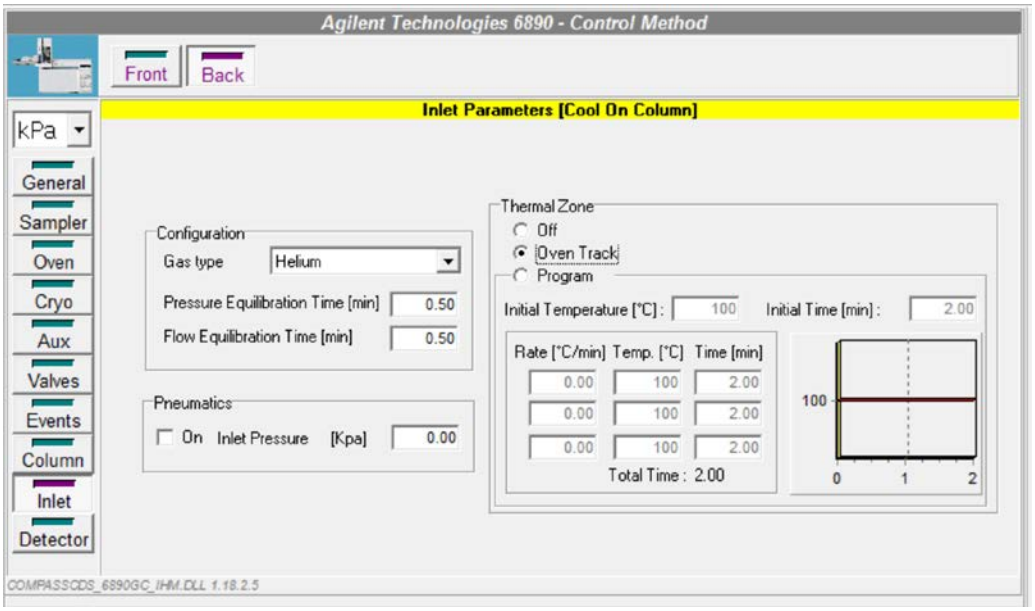
Check the Gas saver on to activate the gas saver. This option is available only if the column parameters have been defined in the Column sub-section.

In the Saver Flow field, enter the gas flow. It must at least equal to column flow, plus 15 mL/min.

In the Saver Time field, enter the time the gas saver is activated. This time must greater than the purge time for splitless injection and greater than injection time for split injection.

NOTE: The Inlet pressure must be equal to the column pressure.

Cool On Column



Configuration Parameter Group

Select the *Gas type*. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, Oxygen, Air, Argon, and Unknown.

In the *Pressure Equilibration Time*, enter the time before the inlet pressure becomes ready. In the *Flow Equilibration Time*, enter the time before the inlet flow becomes ready

Pneumatics Parameter Group

Check the *On* box to activate the inlet pressure. Enter the desired pressure.

Thermal Zone Parameter Group

Select the *Off* option to turn off the thermal zone.

Select the *Oven Track* to make the inlet temperature profile track the oven temperature. The difference between the two temperatures is 3°C.

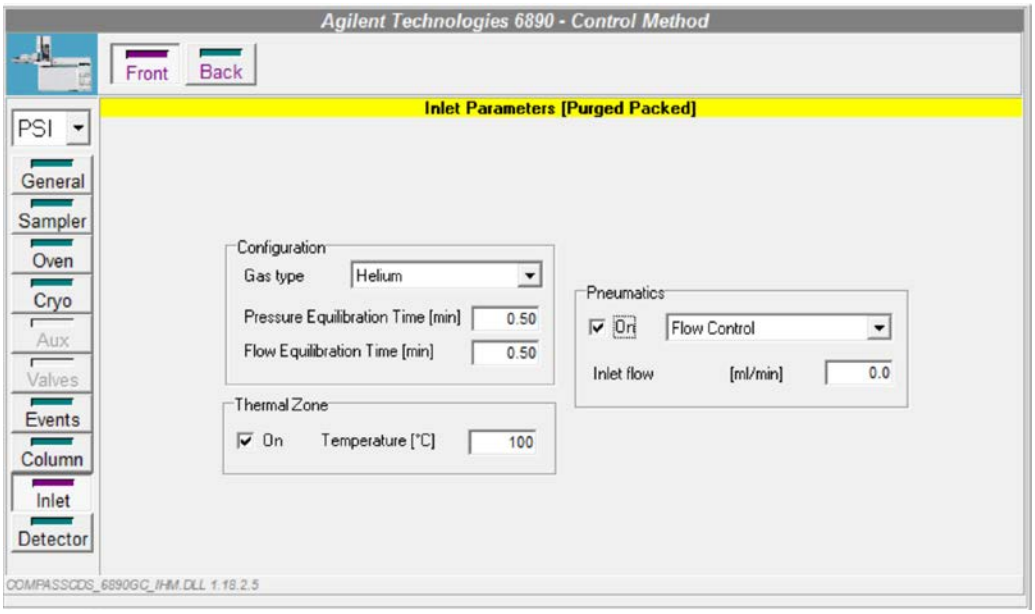
Select *Program* to set the thermal zone program.

In the *Initial Temperature* field, enter the inlet initial temperature in °C.

In the *Initial Time* field, enter the time the inlet stays to the *Initial Temperature* (first plateau) in minutes. In the table program the rates, the plateau temperatures, and duration of the inlet plateau temperature. The graphic on the right of the table displays the temperature program.

The total time of the inlet temperature program is displayed in the *Total Time* field.

Purged Packed



Configuration Parameter Group

Select the *Gas type*. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, Oxygen, Air, Argon, and Unknown.

In the *Pressure Equilibration Time*, enter the time before the inlet pressure becomes ready. In the *Flow Equilibration Time*, enter the time before the inlet flow becomes ready.

Thermal Zone Parameter Group

Check the *On* box to activate the inlet temperature. Enter the desired *Temperature*.

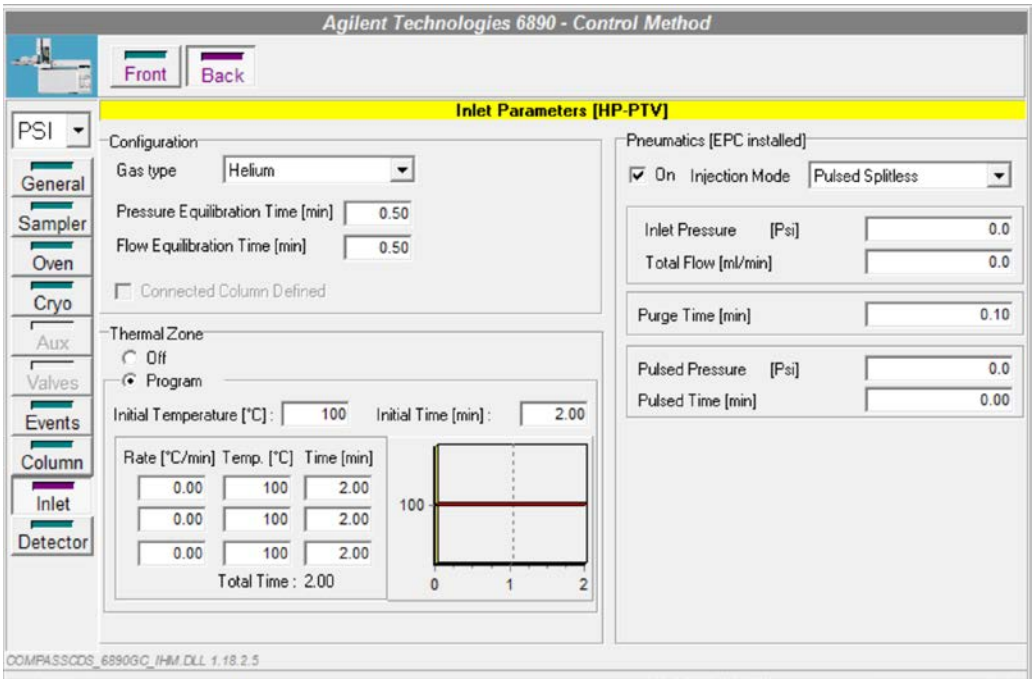
Pneumatics Parameter Group

Check the *On* box to activate the pneumatic parameters.

Select the control mode. The available choices are: *Pressure control* and *Flow control*.

In the *Inlet pressure* field, enter the desired inlet pressure. The unit depends on the control mode choice.

HP – Programmable Temperature Vaporization



Configuration Parameter Group

Select the *Gas type*. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, Oxygen, Air, Argon, and Unknown.

In the *Pressure Equilibration Time*, enter the time before the inlet pressure becomes ready. In the *Flow Equilibration Time*, enter the time before the inlet flow becomes ready

The *Connected Column Defined* field is selected if the column configuration has been defined in the *Column* sub- section.

Thermal Zone Parameter Group

Select the *Off* option to turn off the thermal zone. Select *Program* to set the thermal zone program.

In the *Initial Temperature* field, enter the inlet initial temperature in °C.

In the *Initial Time* field, enter the time the inlet stays to the *Initial Temperature* (first plateau) in minutes.

In the table program the rates, the plateau temperatures, and the duration of the inlet plateau temperature. The graphic to the right of the table displays the temperature program.

The total time of the inlet temperature program is displayed in the *Total Time* field.

Pneumatics Parameter Group

Check the *On* box to activate the pneumatic parameters.

Select the *Injection mode*. The available choices are: *Split*, *Splitless*, *Pulsed split*, *Pulsed splitless* and *Solvent Vent*. According to this choice, the following parameters are activated or not.

In the *Inlet Pressure* field, enter the pressure of the inlet.

In the *Split Ratio* field, enter the ratio between the division flow and column flow. This field is available only if the

Split and *Pulsed Split* inlets are selected.

In the *Purge flow* field, enter the flow of the purge vent in mL/min. This field is available only if the *Splitless* and

Pulsed Splitless inlets are selected.

In the *Total Flow* field, enter the sum of the division flow, the column flow and the septum purge flow. This field is available only if the column parameters have not been defined in the *Column* sub-section.

In the *Purge Time field*, enter the time the purge valve is opened. This field is available only if the *Splitless* and *Pulsed Splitless* inlets are selected.

In the *Pulsed Pressure* field, enter the inlet pressure when the acquisition starts. This field is available only if the

Pulsed Split and *Pulsed Splitless* inlets are selected.

In the *Pulsed Time* field, enter the time the pulsed pressure is maintained in the inlet. This field is available only if the

Pulsed Split and *Pulsed Splitless* inlets are selected.

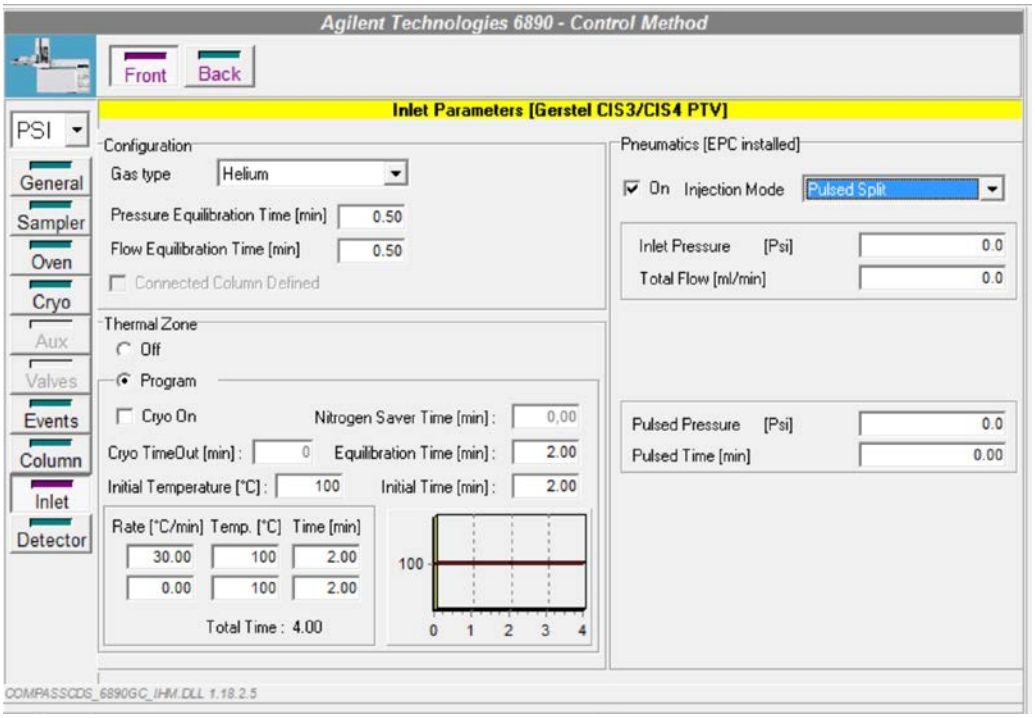
In the *Vent Flow* field, enter the gas flow during the *Vent Time.*

In the *Vent Pressure* field, enter the inlet pressure during the *Vent Time.*

In the *Vent Time* field, enter the vent length from the beginning of the acquisition.

NOTE: The Inlet pressure must be equal to the column pressure.

Gerstel Programmable Temperature Vaporization



Configuration Parameter Group

Select the Gas type. The available choices are: Nitrogen, Hydrogen, Helium and Argon/Methane. In the Pressure Equilibration Time, enter the time before the inlet pressure becomes ready.

In the Flow Equilibration Time, enter the time before the inlet flow becomes ready

The Connected Column Defined field is selected if the column configuration has been defined in the Column sub- section.

Thermal Zone Parameter Group

Select the Off option to turn off the thermal zone. Select Program to set the thermal zone program.

In the Initial Temperature field, enter the inlet initial temperature in °C.

In the Initial Time field, enter the time the inlet stays to the Initial Temperature (first plateau) in minutes.

In the table program the rates, the plateau temperatures, and the duration of the inlet plateau temperature. The graphic to the right of the table displays the temperature program.

The total time of the inlet temperature program is displayed in the Total Time field.

Pneumatics Parameter Group

Check the On box to activate the pneumatic parameters.

Select the Injection mode. The available choices are: Split, Splitless, Pulsed split, Pulsed splitless and Solvent Vent. According to this choice, the following parameters are activated or not.

In the Inlet Pressure field, enter the pressure of the inlet.

In the Split Ratio field, enter the ratio between the division flow and column flow. This field is available only if the Split and Pulsed Split inlets are selected.

In the Purge flow field, enter the flow of the purge vent in mL/min. This field is available only if the Splitless and

Pulsed Splitless inlets are selected.

In the Total Flow field, enter the sum of the division flow, the column flow and the septum purge flow. This field is available only if the column parameters have not been defined in the Column sub-section.

In the Purge Time field, enter the time the purge valve is opened. This field is available only if the Splitless and Pulsed Splitless inlets are selected.

In the Pulsed Pressure field, enter the inlet pressure when the acquisition starts. This field is available only if the

Pulsed Split and Pulsed Splitless inlets are selected.

In the Pulsed Time field, enter the time the pulsed pressure is maintained in the inlet. This field is available only if the

Pulsed Split and Pulsed Splitless inlets are selected.

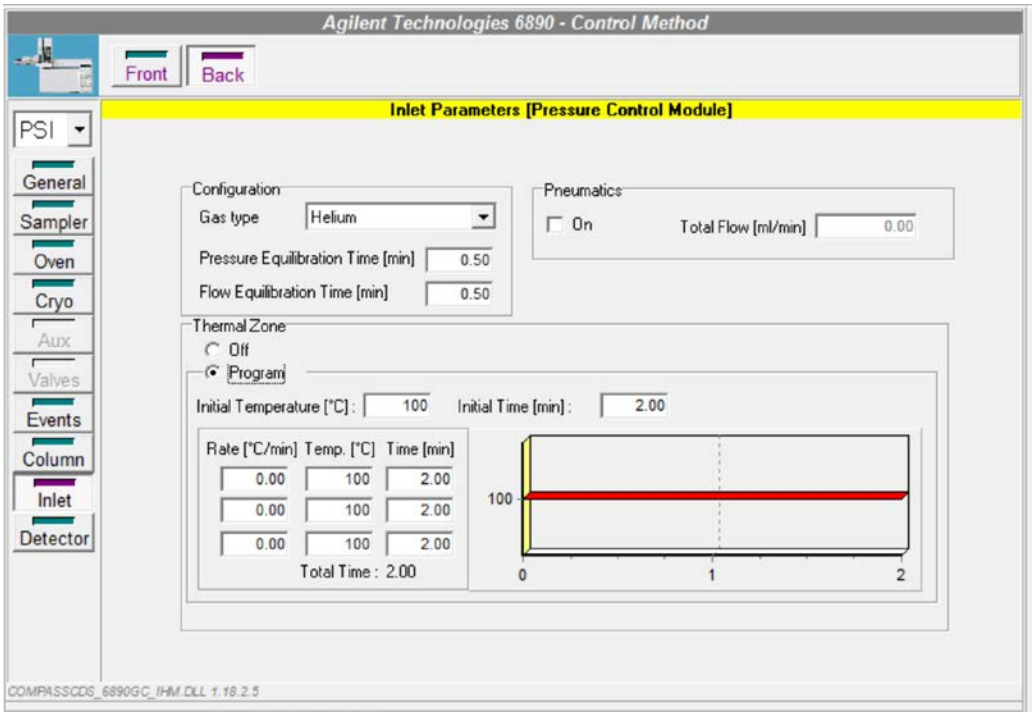
In the Vent Flow field, enter the gas flow during the Vent Time.

In the Vent Pressure field, enter the inlet pressure during the Vent Time.

In the Vent Time field, enter the vent length from the beginning of the acquisition.

NOTE: The Inlet pressure must be equal to the column pressure.

Pressure Control Module (PCM)



Configuration Parameter Group

Select the Gas type. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, Oxygen, Air, Argon, Unknown.

In the Pressure Equilibration Time, enter the time before the inlet pressure becomes ready. In the Flow Equilibration Time, enter the time before the inlet flow becomes ready

Thermal Zone Parameter Group

Check the *On* box to activate the inlet temperature. Enter the desired *Temperature*.

Pneumatics Parameter Group

Check the On box to activate the pneumatic parameters.

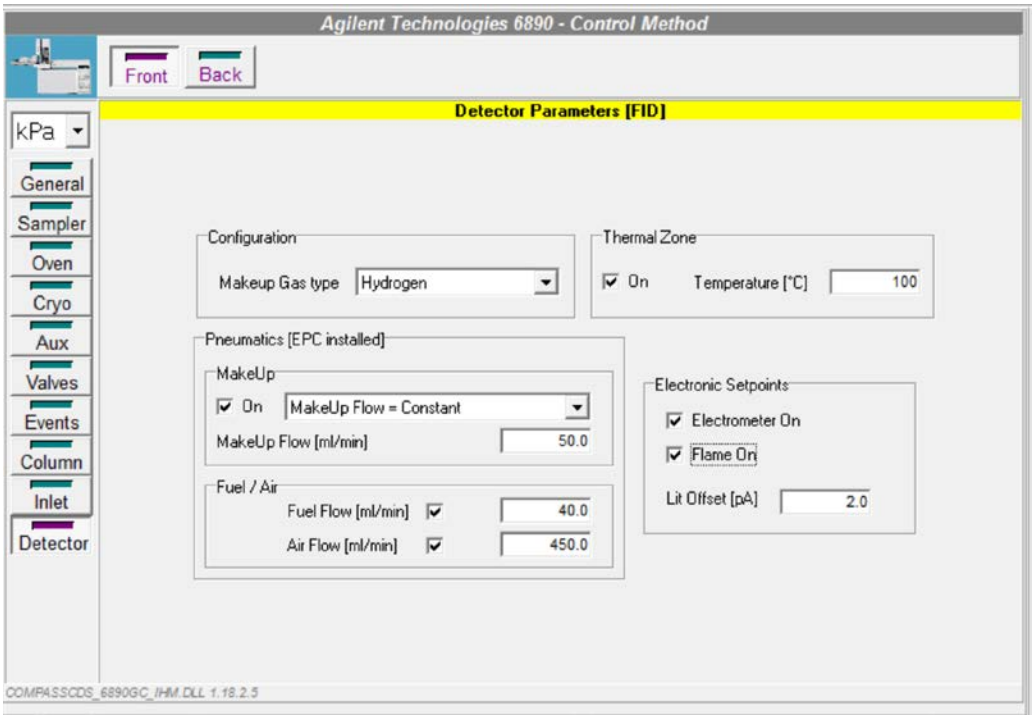
In the Total Flow field, enter the sum of the division flow, the column flow and the septum purge flow.

Detector Control

Depending on the system configuration, select the Front or Back button, to set the information for each detector. The different fields depend on system configuration.

NOTE: The Agilent Technologies 6850 Gas Chromatograph has only one sub-system. Therefore, only the *Front* information must be set.

FID (Flame Ionization Detector)



Configuration Parameter Group

Select the *Makeup Gas type*. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, and Unknown.

Pneumatics Parameter Group

Check the *On* box to force a constant flow.

Select if either the *MakeUp Flow* or the *MakeUp Flow + Column Flow* must be constant. Enter the corresponding constant flow in mL/min

In the *Fuel Flow* field, enter the detector gas flow (typically, hydrogen). In the *Air Flow* field, enter the detector air flow.

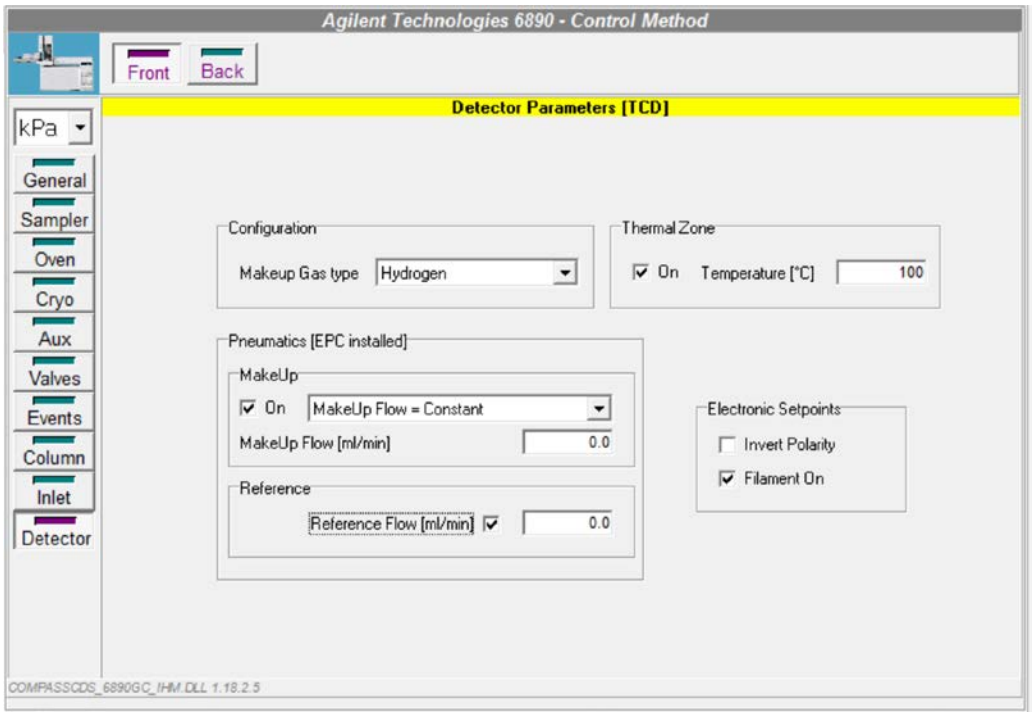
Thermal Zone Parameter Group

Check the *On* box to turn on the detector heater. Enter the desired *Temperature*. Electronic Setpoints parameter group

Check the *Electrometer On* box to turn on the electrometer. Check the *Flame On* box to ignite the flame.

Optionally, enter a *Lit Offset*. This value is the difference between the output when the flame is on and the output when the flame is off. Default value is 2pA.

TCD (Thermal Conductivity Detector)



Configuration Parameter Group

Select the Makeup Gas type. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, and Unknown.

Pneumatics Parameter Group

Check the *On* box to force a constant flow.

Select if either the *MakeUp Flow* or the *MakeUp Flow + Column Flow* must be constant. Enter the corresponding constant flow in mL/min.

Check the *Reference Flow* box and enter the reference gas flow in mL/min.

Thermal Zone Parameter Group

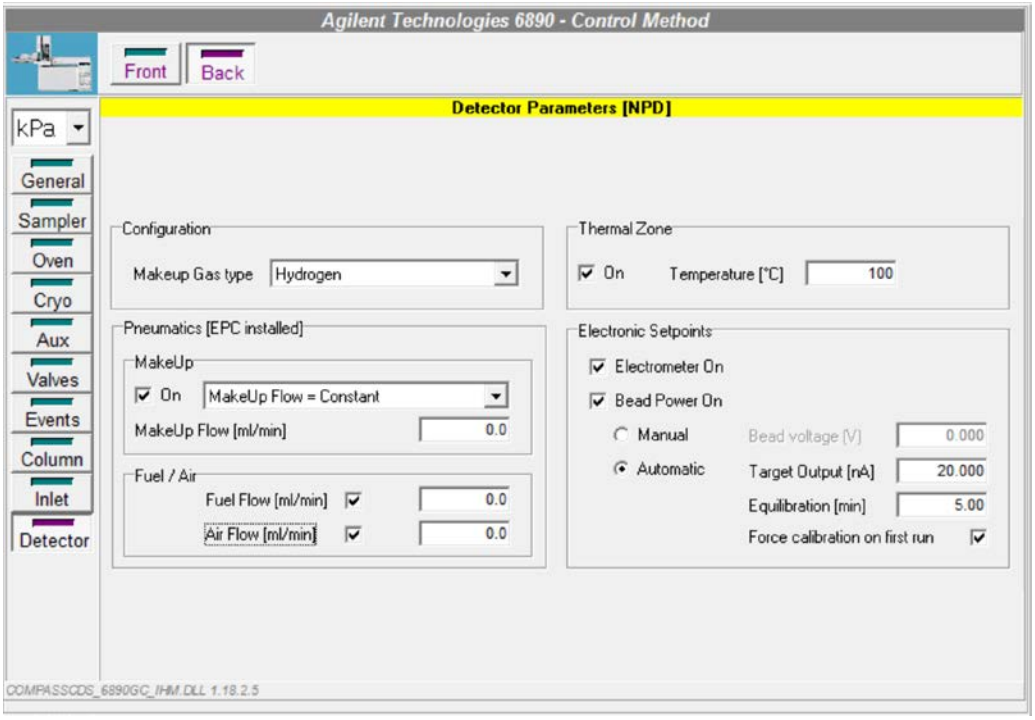
Check the *On* box to turn on the detector heater. Enter the desired *Temperature*.

Electronic Setpoints Parameter Group

Check the *Invert polarity* box to invert the filament polarity. This option must be activated when the thermal conductivity of the components is greater than the carrier gas, otherwise the peaks will be negative.

Check the *Filament On* box to turn on the voltage to the filament.

NPD (Nitrogen-Phosphorus Detector)



Configuration Parameter Group

Select the *Makeup Gas type*. The available choices are: Nitrogen, Hydrogen, Helium, Argon/Methane, and Unknown.

Pneumatics Parameter Group

Check the *On* box to force a constant flow.

Select if either the *MakeUp Flow* or the *MakeUp Flow + Column Flow* must be constant. Enter the corresponding constant flow in mL/min

In the *Fuel Flow* field, enter the detector gas flow (typically, hydrogen). In the *Air Flow* field, enter the detector air flow.

Thermal Zone Parameter Group

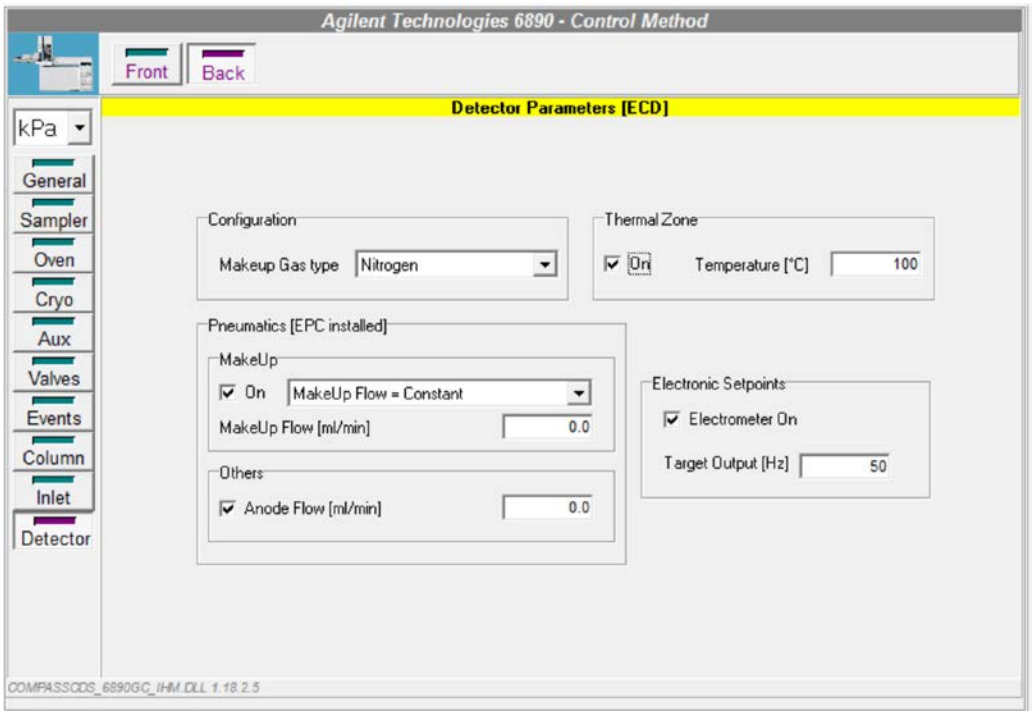
Check the *On* box to turn on the detector heater. Enter the desired *Temperature*.

Electronic Setpoints Parameter Group

Check the *Electrometer On* box to turn on the electrometer. Check the *Bead Power On* box to heat the bead.

- Select *manual* to enter the *Bead voltage* use to heat the bead.
- Select *Automatic* and fill the *Target Output [nA]*, the time of *Equilibration [min*] and if you want or not *Force calibration on first run*

ECD (Electron Capture Detector)



Configuration Parameter Group

Select the Makeup Gas type. The available choices are: Nitrogen, Argon/Methane, and Unknown.

Pneumatics Parameter Group

Check the *On* box to force a constant flow.

Select if either the *MakeUp Flow* or the *MakeUp Flow + Column Flow* must be constant. Enter the corresponding constant flow in mL/min

In the *Anode Flow* field, enter the anode gas flow.

Thermal Zone Parameter Group

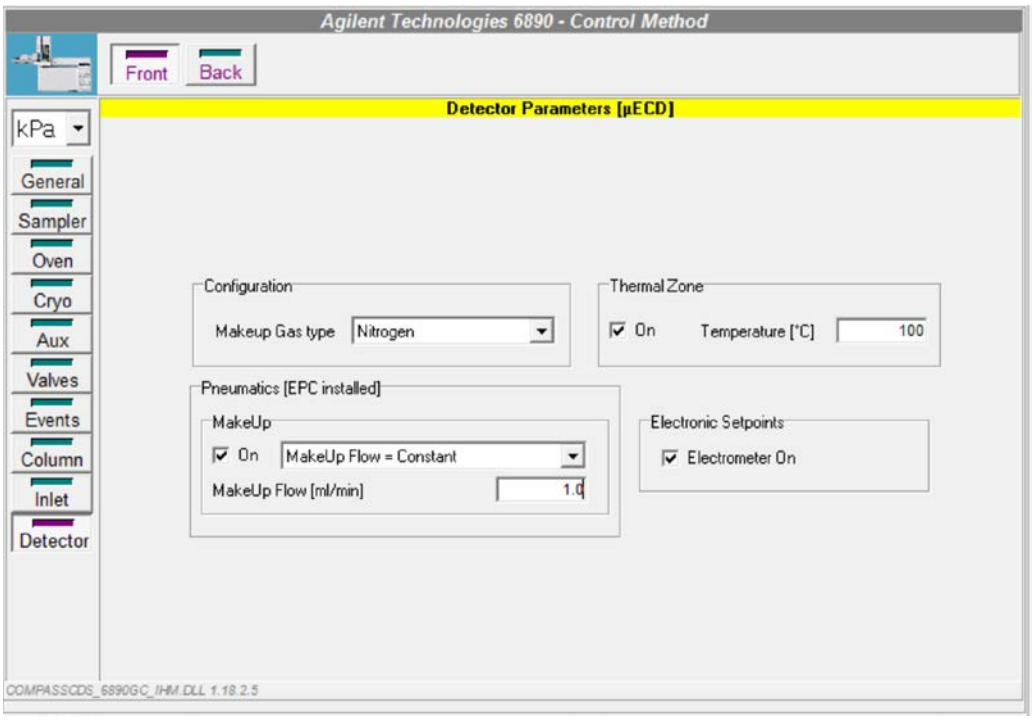
Check the On box to turn on the detector heater. Enter the desired Temperature.

Electronic Setpoints Parameter Group

Check the *Electrometer On* box to turn on the electrometer.

In the *Target Output* field, enter the detector target output in Hz.

µECD (micro Electron Capture Detector)



Configuration Parameter Group

Select the Makeup Gas type. The available choices are: Nitrogen, Argon/Methane, and Unknown.

Pneumatics Parameter Group

Check the *On* box to force a constant flow.

Select if either the *MakeUp Flow* or the *MakeUp Flow + Column Flow* must be constant. Enter the corresponding constant flow in mL/min

Thermal Zone Parameter Group

Check the On box to turn on the detector heater. Enter the desired Temperature.

Electronic Setpoints Parameter Group

Check the *Electrometer On* box to turn on the electrometer.

Starting and Viewing an Acquisition

Quick Start and Sequence

Once the instrument control method has been correctly programmed, an analysis can be started. The next section briefly describes how to start an acquisition.

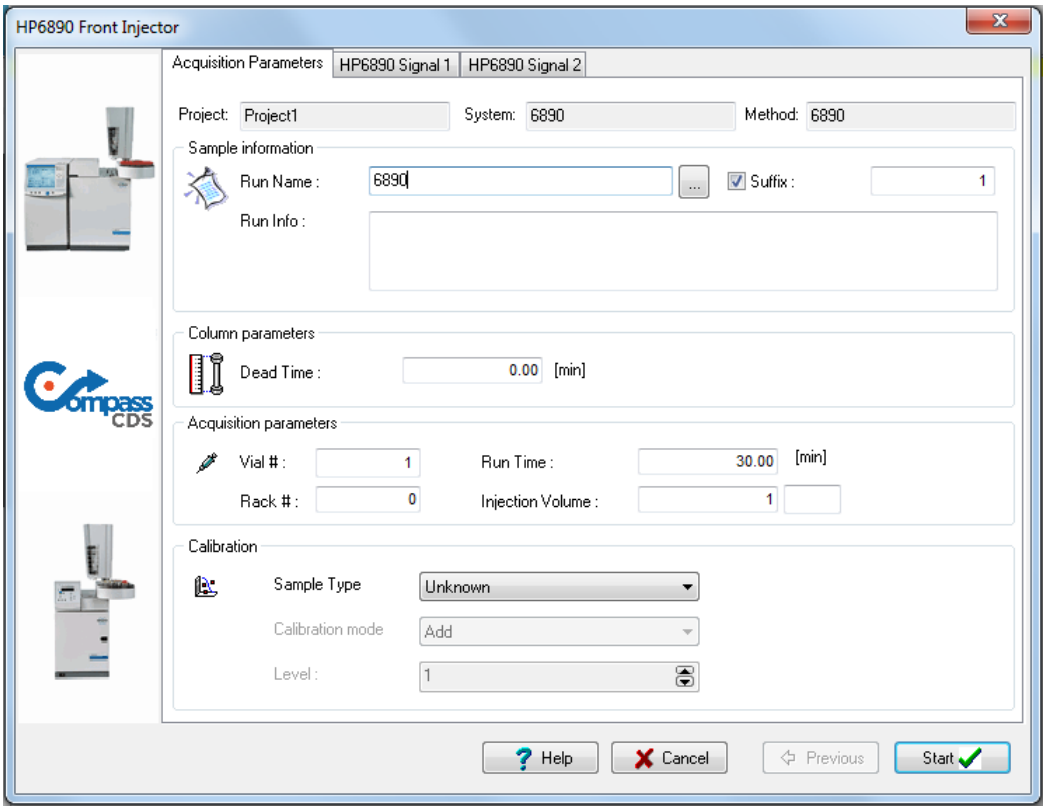
Quick Start (Single Acquisition)

1. Press the button.

   In the Quick Start window, select the system, the method and optionally the project if connected in "All project" mode.

2. Press the OK button.

   The following screen is displayed



   In the Acquisition parameters tab, required fields like the Run Name, the Run ID and the Acquisition length must be filled in before starting an analysis. Furthermore, if the system is equipped with an autosampler controlled by the CompassCDS Chromatography Data System, the Injection Volume, the Vial position and the Rack number (if required) must be entered.

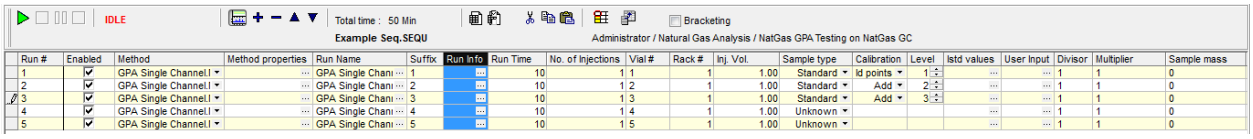
   Other parameters associated with each acquisition channel can be entered in the Channel X tab.

3. Click on the Start button to start the acquisition if the system is a single-injector system or click on the Next button if the system is a multiple injector system. In a multiple injector

system, the same parameters entered for the first injector must be entered for the other injectors before starting the acquisition.

Sequence

1. To create a sequence, select the FILE / NEW SEQUENCE menu, and complete the displayed creation wizard screen (refer to the CompassCDS Chromatography Data System User Guide), by entering the system name that will perform the analysis, the number of lines (corresponding to the number of samples), and the sequence name.
2. The sequence is displayed. Complete the sequence information columns (refer to the CompassCDS Chromatography Data System User Guide).



Run #	Enabled	Method	Method properties	Run Name	Suffix	Run Info	Run Time	No. of Injections	Vial #	Rack #	Inj. Vol.	Sample type	Calibration	Level	Istd values	User Input	Divisor	Multiplier	Sample mass
1	☑	GPA Single Channel.I		GPA Single Chani	1		10	1	1	1	1.00	Standard	Id points	1			1	1	0
2	☑	GPA Single Channel.I		GPA Single Chani	2		10	1	2	1	1.00	Standard	Add	2			1	1	0
3	☑	GPA Single Channel.I		GPA Single Chani	3		10	1	3	1	1.00	Standard	Add	3			1	1	0
4	☑	GPA Single Channel.I		GPA Single Chani	4		10	1	4	1	1.00	Unknown					1	1	0
5	☑	GPA Single Channel.I		GPA Single Chani	5		10	1	5	1	1.00	Unknown					1	1	0

The Method Name, the Run Name, the Run ID, and the Acquisition length must be filled in before starting the analysis. All these parameters are automatically imported from the acquisition part if defined in the method.

3. Start the sequence by clicking on the button.

NOTE: For more details about how to start an acquisition, refer to the CompassCDS Chromatography Data System User Guide.

NOTE: The volume that will be injected depends of the syringe size. Only five levels of injection volume can be programmed for this driver in the Acquisition sub-method part: 1, 2, 3, 4 and 5. These values represent the number of tenths of the syringe volume. For example if the entered volume is 3 and the syringe volume is 10 µL, the injected volume will be 3 tenths of 10 µL=3 µL. A physical turret option called Nanoliter allows the injection of smaller volume (refer to the Agilent manual to learn more about this option). Refer to the Appendix (Injection Volumes section) to see the correspondence between the programmed levels and the real injected volumes.

Running Acquisition Status

Viewing a Running Acquisition

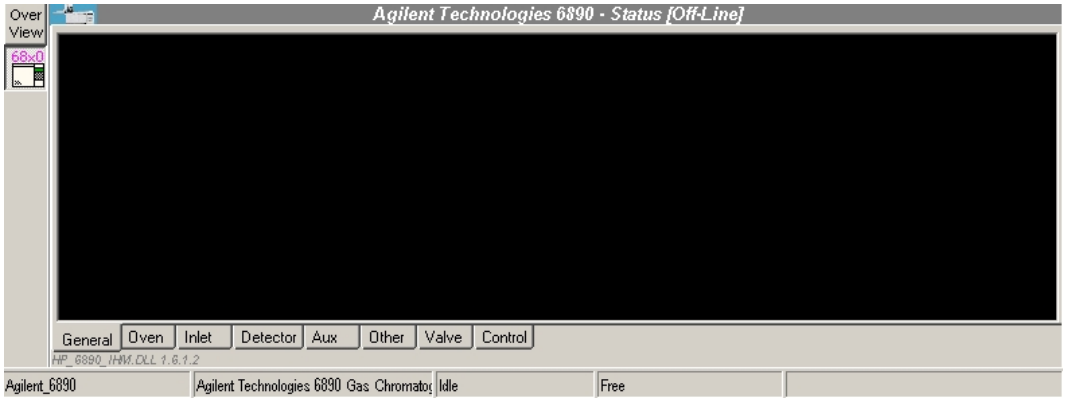
To view a running acquisition, click on the *Systems* tab then select the running system. A window is activated which is composed of two parts: the running chromatogram and the status window where the driver modules are listed.

Status of the Agilent 6890 Gas Chromatograph

Click on the button corresponding to the Agilent 6890 Gas Chromatograph driver and the Agilent Technologies 6890 Gas Chromatograph status screen will appear. It contains nine sub-sections: General, Oven, Inlet, Detector, Aux, Other, Valve, Control and, Gerstel. Click on the required sub-section to display the corresponding screen.

Click on the correct node in the tree-view to display the corresponding screen.

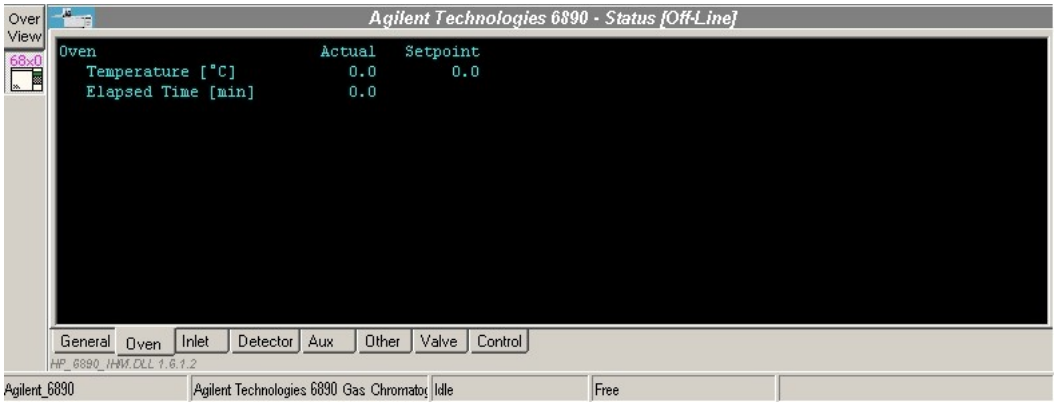
General Window



This is a read-only window.

Information about the instrument status is displayed: Faults, not ready parameters, etc.

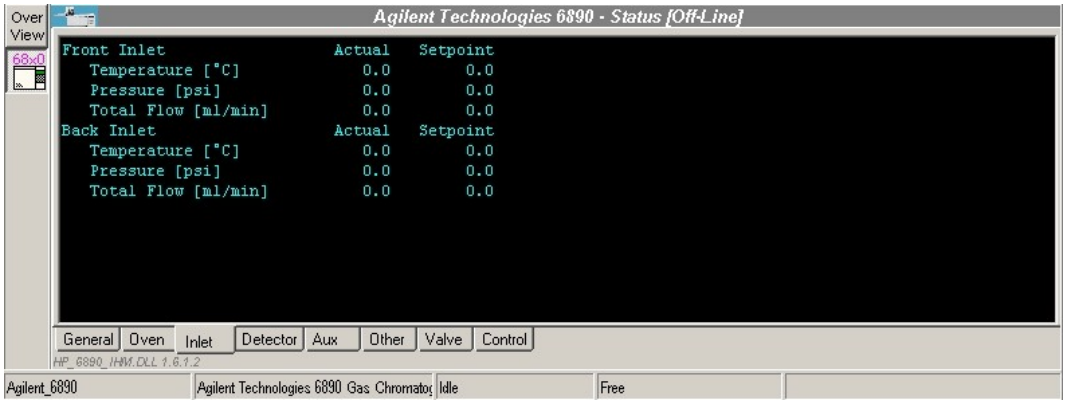
Oven Window



This is a read-only window.

The actual and setpoint temperatures of the oven and the elapsed time are displayed.

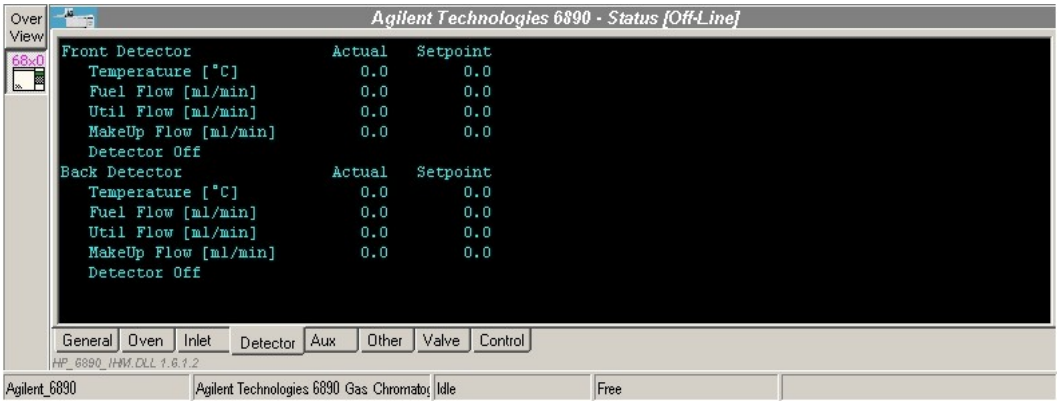
Inlet Window



This is a read-only window.

The actual and setpoint temperature, pressure, and flow of the inlet(s) are displayed.

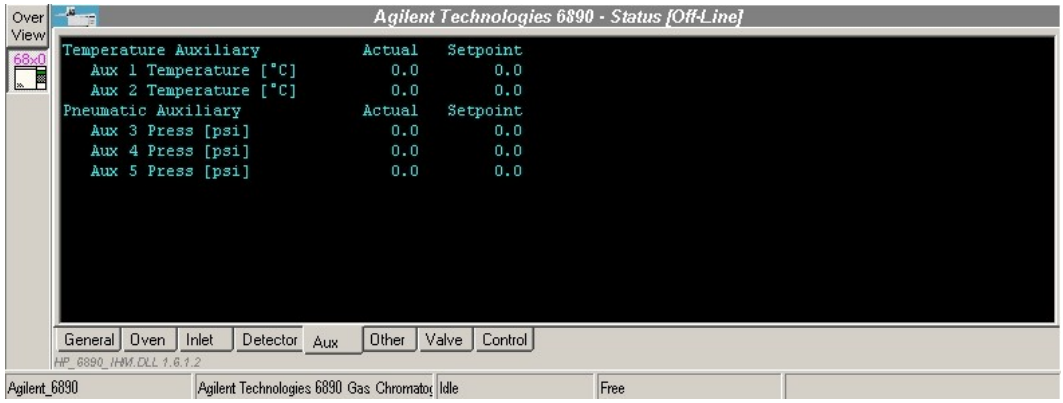
Detector Window



This is a read-only window.

The actual and setpoint temperatures and gas flows of the detector(s) are displayed.

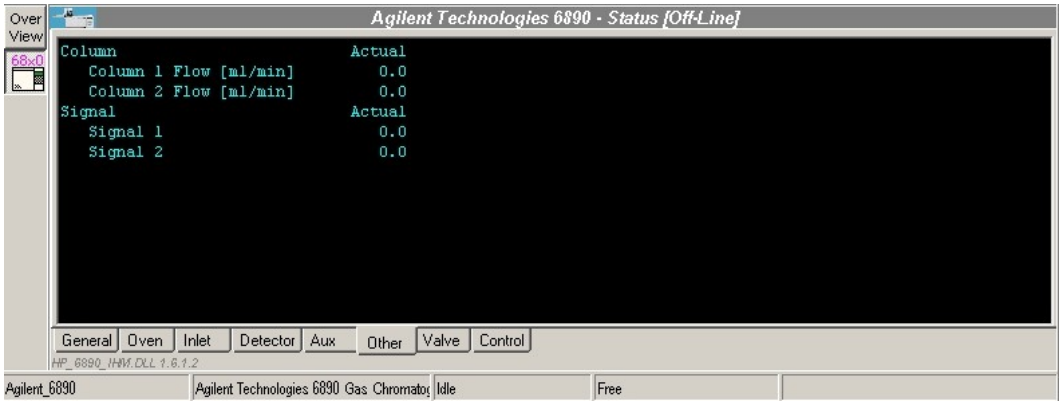
Aux Window


Agilent Technologies 6890 - Status [Off-Line]
Temperature Auxiliary Actual Setpoint
Aux 1 Temperature [°C] 0.0 0.0
Aux 2 Temperature [°C] 0.0 0.0
Pneumatic Auxiliary Actual Setpoint
Aux 3 Press [psi] 0.0 0.0
Aux 4 Press [psi] 0.0 0.0
Aux 5 Press [psi] 0.0 0.0
General Oven Inlet Detector Aux Other Valve Control
Agilent_6890
Idle
Free

This is a read-only window.

The actual and setpoint temperatures or pressures of the auxiliary(ies) are displayed.

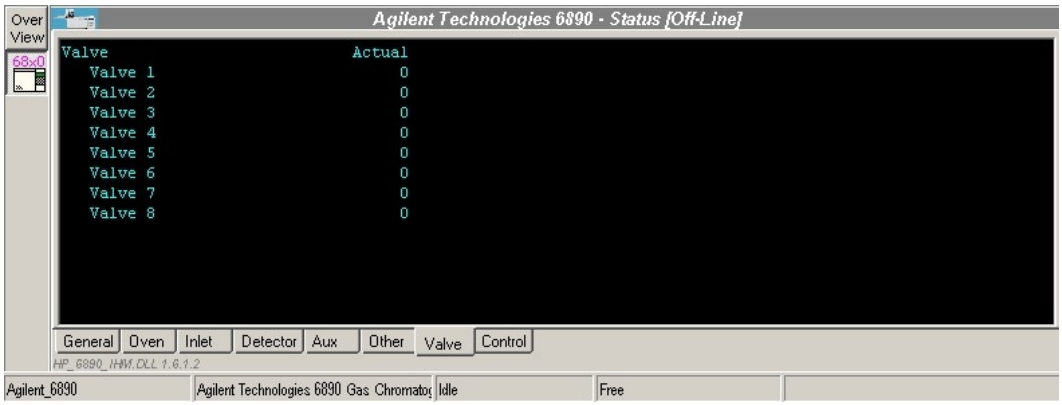
Other Window



This is a read-only window.

The actual column flows are displayed.

Valve Window



This is a read-only window.

The actual valve positions are displayed.

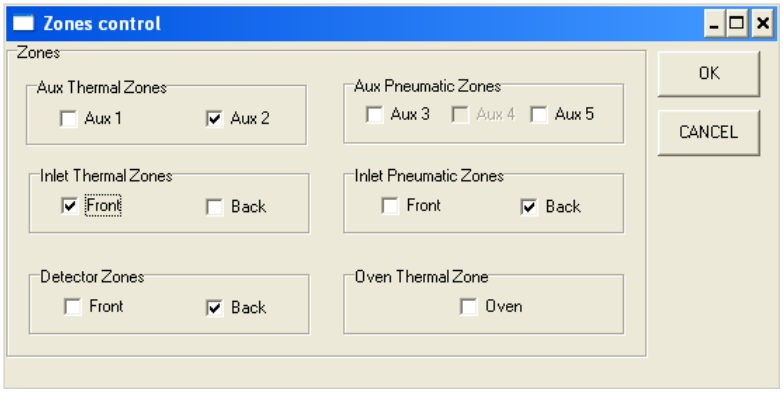
Control Window

This window allows direct control of the 6890 GC.

unlocks the chromatograph keyboard

locks chromatograph keyboard

gives access to the Zone control screen



From this screen, you can turn on/off the different thermal zones of the GC.

The button stops the chromatograph.

Select *Set Oven Temperature* line, to change the oven temperature and then enter the desired temperature in the

Oven Temperature field and click on the button to send the new value to the 6890 GC.

Select *Set front (*or *Back) Detector Temperature* line, to change the detector temperature and then enter the desired temperature in the *front (*or *Back) Detector Temperature* field and click on the button to send the new value to the 6890 GC.

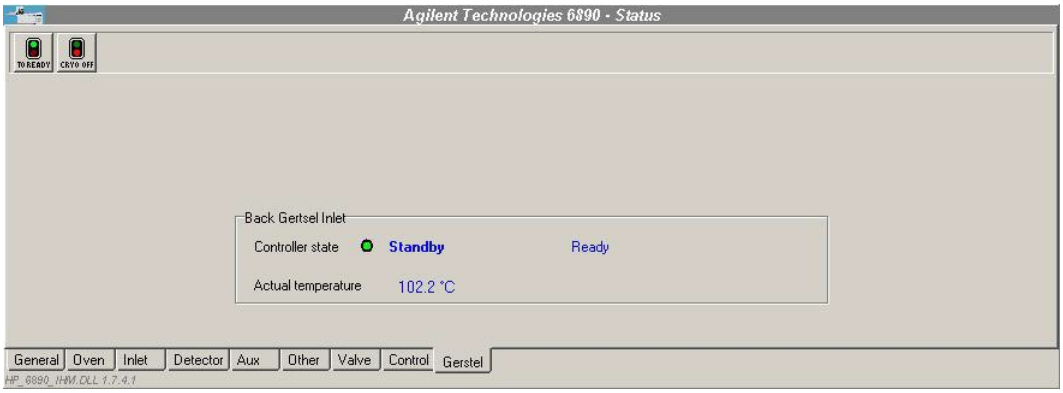
Select *Set front (*or *Back) Inlet Temperature* line, to change the inlet temperature and then enter the desired temperature in the *front (*or *Back) Inlet Temperature* field and click on the button to send the new value to the 6890 GC.

Select *Set Aux1 (*or *Aux2) Temperature* line, to change the auxiliary temperature and then enter the desired temperature in the *Aux1 (*or *Aux2) Temperature* field and click on the button to send the new value to the 6890 GC.

NOTE: Each time a method is downloaded to the instrument, the flow rate is updated to the value in the method and the flow rate sent with the direct control window is overwritten.

NOTE: All the direct control buttons are deactivated during a run.

Gerstel Window



This is a read-only window.

The state and the temperature of the Gerstel PTV are displayed.

turns on the cryogenic cooling of the Gerstel PTV

turns off the cryogenic cooling of the Gerstel PTV

Overview Window

Click on the

button: for 6890 GC, nothing is displayed.

Appendix

Injection Volumes

The volume that will be injected depends of the syringe size. Only five levels of injection volume can be programmed for the 6890 in the Acquisition sub-method part: 1, 2, 3, 4 and 5, and six levels of injection volume can be programmed for the 6850 in the Acquisition sub-method part: 1, 2, 3, 4, 5 and 6. These values represent the number of tenths of the syringe volume. For example if the entered volume is 3 and the syringe volume is 10 µL, the injected volume will be 3 tenths of 10 µL = 3 µL. A physical turret option called *Nanoliter* allows the injection of smaller volume (refer to the Agilent manual to learn more about this option). The following table gives the injected volumes according to the value entered in the Acquisition sub-method part.

Injection volume depending on the syringe volume for the 6890

Nanoliter Option	Off - 6890		On - 6890	
	Entered Value	**Injected Volume**	**Entered Value**	**Injected Volume**
5 µL Syringe	1	0.5	1	0.1
	2	1.0	2	0.5
	3	1.5	3	1.0
	4	2.0	4	1.5
	5	2.5	5	2.0
10 µL Syringe	1	1.0	1	0.2
	2	2.0	2	1.0
	3	3.0	3	2.0
	4	4.0	4	3.0
	5	5.0	5	4.0
25 µL Syringe	1	2.5	1	0.5
	2	5.0	2	2.5
	3	7.5	3	5.0
	4	10.0	4	7.5
	5	12.5	5	10.0
50 µL Syringe	1	5.0	1	1.0
	2	10.0	2	5.0
	3	15.0	3	10.0
	4	20.0	4	15.0
	5	25.0	5	20.0
100 µL Syringe	1	10.0	1	2.0
	2	20.0	2	10.0
	3	30.0	3	20.0
	4	40.0	4	30.0
	5	50.0	5	40.0

Injection volume depending on the syringe volume for the 6850

Nanoliter Option	Off - 6850		On - 6850	
	Entered Value	**Injected Volume**	**Entered Value**	**Injected Volume**
5 µL Syringe	1	0.5	1	0.1
	2	1.0	2	0.5
	3	1.5	3	1.0
	4	2.0	4	1.5
	5	2.5	5	2.0
			6	2.5
10 µL Syringe	1	1.0	1	0.2
	2	2.0	2	1.0
	3	3.0	3	2.0
	4	4.0	4	3.0
	5	5.0	5	4.0
			6	5.0
25 µL Syringe	1	2.5	1	0.5
	2	5.0	2	2.5
	3	7.5	3	5.0
	4	10.0	4	7.5
	5	12.5	5	10.0
			6	12.5
50 µL Syringe	1	5.0	1	1.0
	2	10.0	2	5.0
	3	15.0	3	10.0
	4	20.0	4	15.0
	5	25.0	5	20.0
			6	25.0
100 µL Syringe	1	10.0	1	2.0
	2	20.0	2	10.0
	3	30.0	3	20.0
	4	40.0	4	30.0
	5	50.0	5	40.0
			6	50.0

Configuring the GC RS232 Communication

This appendix describes how to fix the IP address in the Agilent 6890 GC.

1. On the GC, press the [OPTION] button. The following screen will be displayed.

2. Scroll down to the Communication line and press [ENTER]. The following screen will be displayed.

3. Scroll down to the Baud rate line and press the [MODE/TYPE] button.

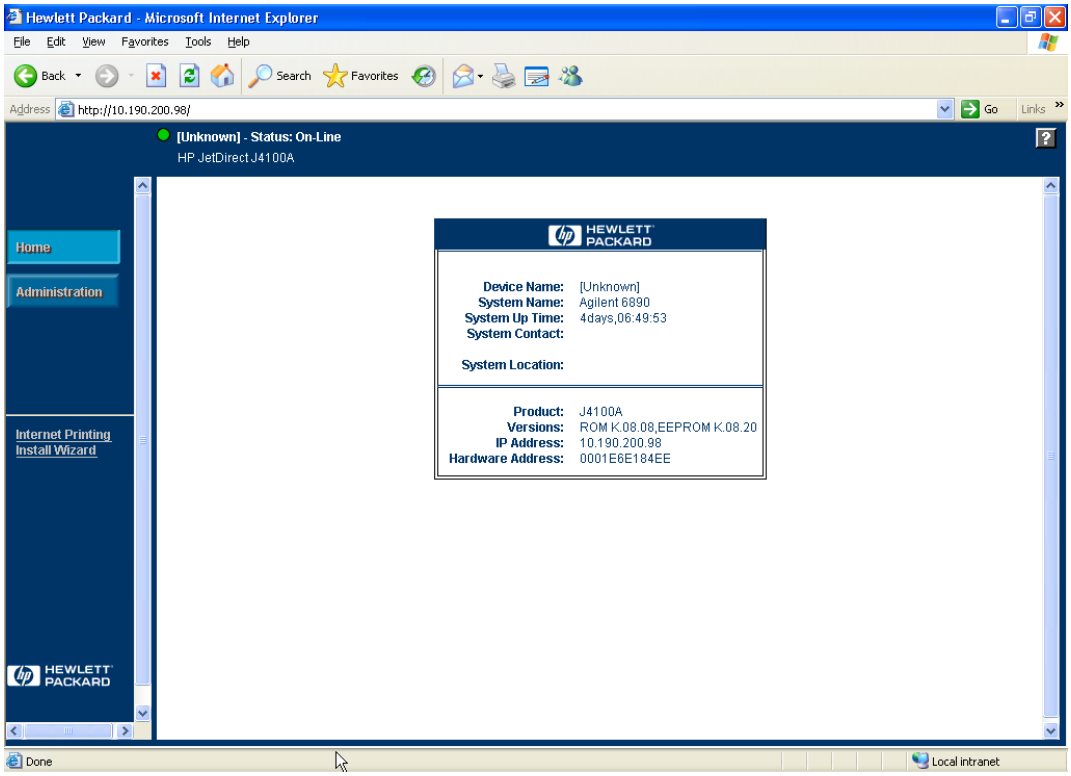
4. Scroll down the arrow to the 19200 line and press [ENTER].
5. Repeat the same operation for the rest of the parameters until all the parameters are set like below.

6. Reboot the GC.

Configuring a Fixed IP address

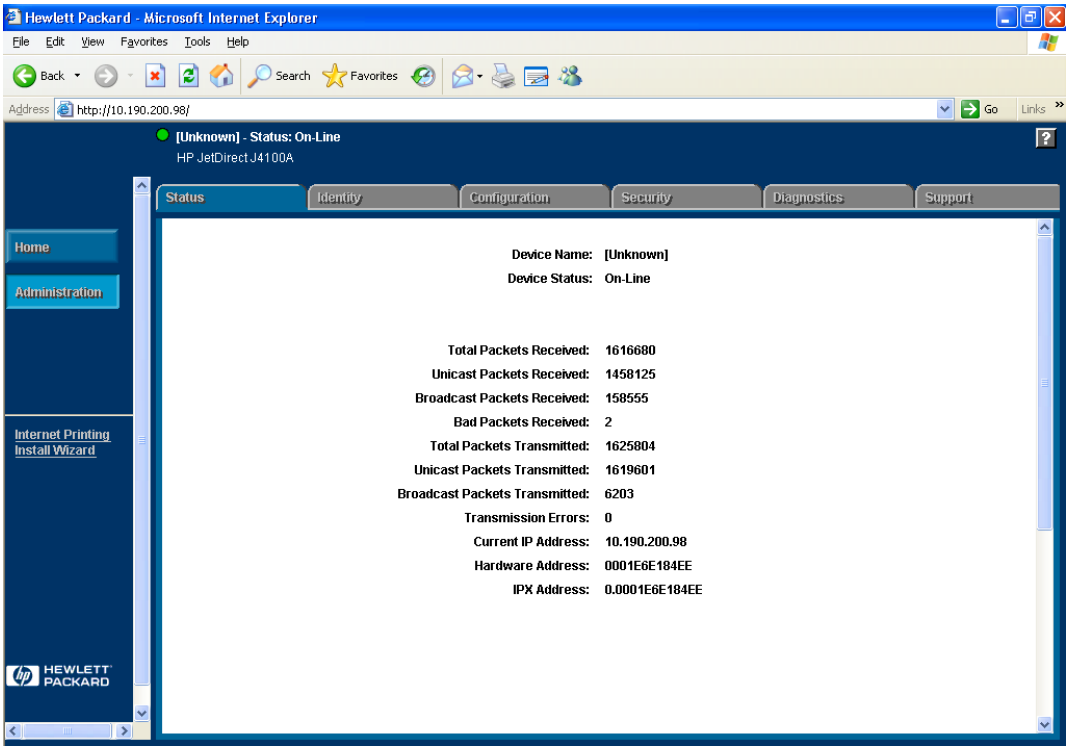
This appendix describes how to fix the IP address in the Agilent 6890 GC.

1. The Agilent 6890 GC must have been given a valid IP address via the BOOTP server.
2. In a web browser (Internet explorer for example) from the Acquisition server, type the IP address of the GC, in the address field. If the Internet browser is configured with a proxy server, it is mandatory to enter the IP address of the GC in the exceptions list. The following screen will be displayed.

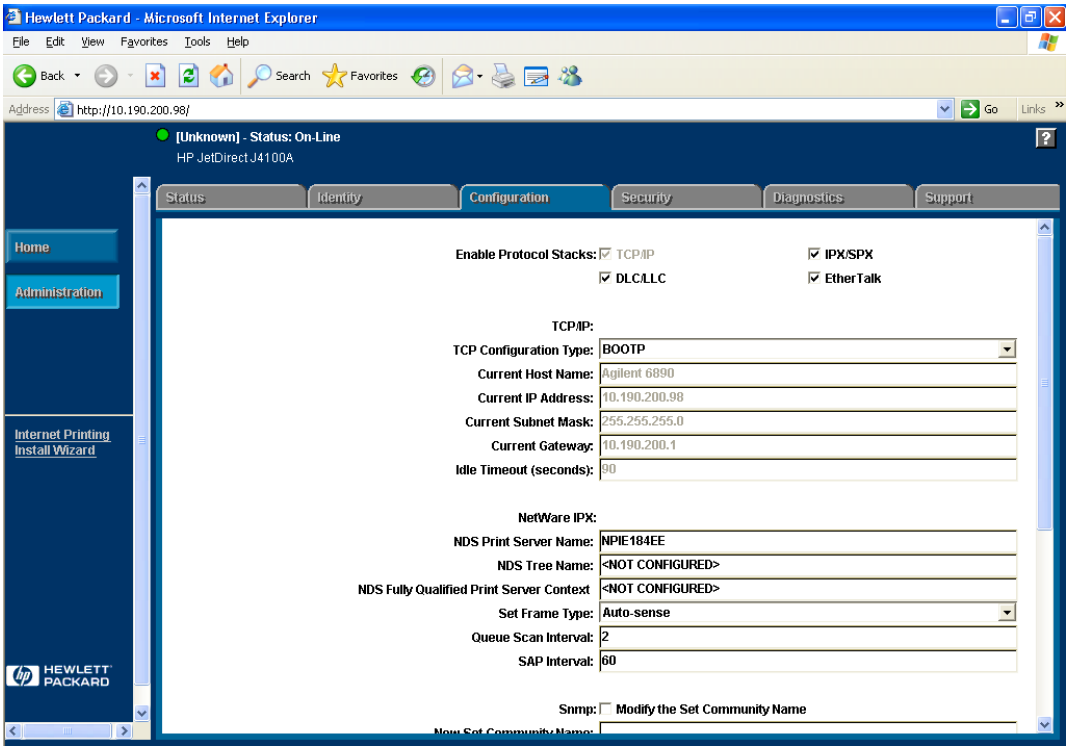


3. Click on the

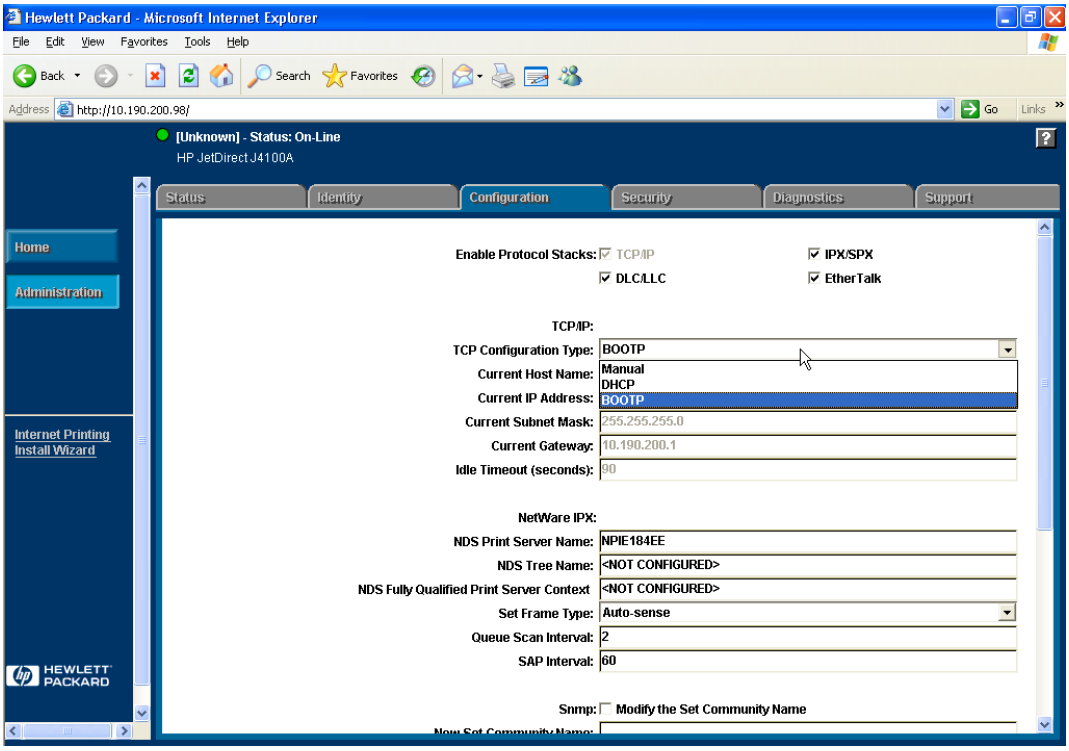
button on the left of the screen.



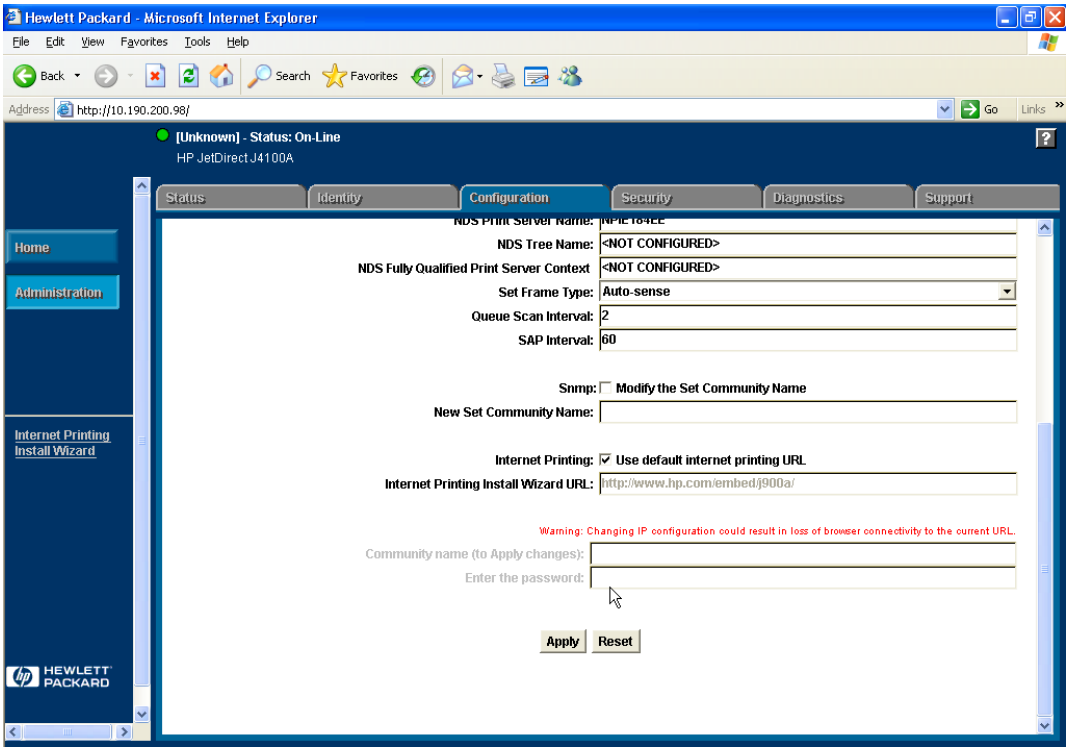
4. Click on the Configuration tab.



5. Select Manual in the *TCP Configuration Type* dropdown list.



6. Type the desired IP address, subnet mask and gateway in the corresponding fields.
7. Finally, scroll down to the bottom of the screen and press the Apply button.


Hewlett Packard - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.190.200.98/
Go Links
[Unknown] - Status: On-Line
HP JetDirect J4100A
Status Identity Configuration Security Diagnostics Support
Home
Administration
Internet Printing Install Wizard
HEWLETT PACKARD
NDS Tree Name: <NOT CONFIGURED>
NDS Fully Qualified Print Server Context <NOT CONFIGURED>
Set Frame Type: Auto-sense
Queue Scan Interval: 2
SAP Interval: 60
Snmp: Modify the Set Community Name
New Set Community Name:
Internet Printing: Use default internet printing URL
Internet Printing Install Wizard URL: http://www.hp.com/embed/j900a/
Warning: Changing IP configuration could result in loss of browser connectivity to the current URL.
Community name (to Apply changes):
Enter the password:
Apply Reset

8. Reboot the GC.